



**EARLY
INTERVENTION
FOUNDATION**

ADVERSE CHILDHOOD
EXPERIENCES: WHAT WE KNOW,
WHAT WE DON'T KNOW, AND
WHAT SHOULD HAPPEN NEXT

Adverse childhood experiences

**What we know,
what we don't know,
and what should
happen next**

February 2020

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About EIF

The Early Intervention Foundation (EIF) is an independent charity established in 2013 to champion and support the use of effective early intervention to improve the lives of children and young people at risk of experiencing poor outcomes.

Effective early intervention works to prevent problems occurring, or to tackle them head-on when they do, before problems get worse. It also helps to foster a whole set of personal strengths and skills that prepare a child for adult life.

EIF is a research charity, focused on promoting and enabling an evidence-based approach to early intervention. Our work focuses on the developmental issues that can arise during a child's life, from birth to the age of 18, including their physical, cognitive, behavioural and social and emotional development. As a result, our work covers a wide range of policy and service areas, including health, education, families and policing.

EIF IS PROUD TO BE A MEMBER OF
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Summary

Adverse childhood experiences: What we know, what we don't know, and what should happen next

1

Research into adverse childhood experiences (ACEs) has generated a powerful and accessible narrative which has helpfully increased awareness of the lifetime impact of early adversity on children's outcomes.

Research into ACEs consistently shows that a set of 10 adverse experiences in childhood are associated with an increased risk of poor health and other problems in later life. This consistent and compelling evidence has brought greater focus from a wide range of policy-makers and public services on the harm caused by child abuse, neglect and other adversities. However, this ACE narrative has increasingly dominated the debate about the role of public services in preventing and responding to childhood experiences of trauma. It has resulted in several misconceptions which must be addressed as the ACE agenda is taken forward.

2

The current popularity of the ACE narrative should not lead us to ignore the limitations in the current evidence base or be allowed to create the illusion that there are quick fixes to prevent adversity or to help people overcome it.

It is essential that children's policy and services respond to the fact that understanding, measuring and assessing need is complex, as is responding effectively to complex social problems. We urge caution on the ACE agenda given that:

- **Current estimates of the prevalence of ACEs are imprecise.** Although we know that childhood adversities and vulnerabilities are prevalent, we do not know *how* prevalent. For example, people are not always able to accurately recall whether they have experienced adversities, such as abuse, in childhood.
- **Good data on the prevalence of childhood adversity and wider risk factors is lacking.** More accurate estimates are essential for understanding the scale of childhood adversity, in order to plan services and to ensure that effective interventions are available for the children and families who most need them.
- **A focus on the original 10 ACEs to the exclusion of other factors risks missing people who also need help.** Many other negative circumstances in childhood are also associated with poor adult outcomes. These circumstances include economic disadvantage, discrimination, peer victimisation, low birth weight and child disability. For example, studies show that low family income may be a stronger predictor of poor physical health outcomes than many of the original ACE categories.
- **ACEs do not occur in isolation.** While ACEs occur across society, they are far more prevalent among those who are poor, isolated or living in deprived circumstances. These social inequalities not only increase the likelihood of ACEs, but also amplify their negative impact. This means that structural inequalities must be addressed for ACE-related policies, services and interventions to have any meaningful effect.

- **The evidence raises serious concerns about the ethics of some ACE screening practices.** ACE screening (including routine enquiry) is increasingly being used to identify children with symptoms of trauma, as a result of current or recent adversity. However, a number of major questions remain. Few evaluations to date have rigorously considered whether ACE screening is an effective method for identifying vulnerable children and making treatment decisions. We do not know whether ACE screening activities could inadvertently retraumatise children or cause other forms of harm. Serious concerns have been raised about whether some ACE screening practices are ethical in the absence of referral to effective treatments. And we should also recognise that such screening tools are unlikely to be a substitute for empathetic conversations by skilled and supervised practitioners.
- **Trauma-informed care has the potential to improve the quality of practice, but caution should be used in considering it to be a sufficient response to the complex problems of childhood adversity.** Governments and public agencies have invested in trauma-informed care as a way of increasing practitioner awareness of the effects of early trauma. However, what constitutes trauma-informed care is not well defined and current practice is highly varied across different settings. There is also limited robust UK evidence that demonstrates it improves outcomes for children. Further specification and testing are needed to fully understand its benefits for children who have experienced adversity.

3

The current enthusiasm for tackling ACEs should be channelled into creating comprehensive public health approaches in local communities, built on the evidence of what works to improve outcomes for children.

The original ACE study concluded that comprehensive strategies, involving universal, selected and targeted interventions were necessary to prevent and reduce ACEs. We agree with this position, but believe this must be part of a wider, whole-system approach.

WHAT WOULD A GOOD PUBLIC HEALTH APPROACH LOOK LIKE?

Tackling the conditions in which ACEs are more prevalent. National and local policies have a critical role to play in addressing wider social and economic conditions that can increase the likelihood of children being exposed to early adversity. This would include a focus on factors such as poverty and community crime, which negatively impact children's development and are associated with ACEs.

Improving the strength of national and local systems for preventing childhood adversity and providing support to the families and children who are the most vulnerable. The magnitude of the scale and impact of childhood adversity means that a response cannot be provided by a single service or intervention. An appropriate response instead requires a system-wide focus on the negative impact of childhood adversity, with workforce practice, services, commissioning and leadership all aligned in a commitment to identifying and meeting the needs of the most vulnerable families. This should include:

- Effective leadership, which ensures that services are well configured and connected to meet the needs of the local population.
- Strong professional workforces, who are equipped to meet the needs of children and families struggling with adversity. This support should include training and supervision, as well as the time necessary to establish positive relationships with families.
- Strong services, which includes the use of interventions with good evidence of improving outcomes for children. We have identified 33 interventions representing 10 intervention models with robust evidence of preventing ACEs, reducing the health-harming behaviours associated with ACEs, or reducing ACE-related trauma.

Significant investment into research on childhood adversity. This would include addressing the evidence gaps identified in this report and the rigorous evaluation of a comprehensive public health response to tackling adversity.

Introduction to ACEs

Adverse childhood experiences (ACEs) are traditionally understood as a set of 10 traumatic events or circumstances occurring before the age of 18 that have been shown through research to increase the risk of adult mental health problems and debilitating diseases. Five ACE categories are forms of child abuse and neglect, which are known to harm children and are punishable by law, and five represent forms of family dysfunction that increase children's exposure to trauma.

What are the 10 ACEs?

The 10 original ACEs are:

- physical abuse
- sexual abuse
- psychological abuse
- physical neglect
- psychological neglect
- witnessing domestic abuse
- having a close family member who misused drugs or alcohol
- having a close family member with mental health problems
- having a close family member who served time in prison
- parental separation or divorce on account of relationship breakdown.

The fact that ACEs are harmful should be sufficient reason for implementing strategies to stop and prevent them. However, consistent evidence showing that ACEs also predict poor adult outcomes has made the need for these strategies even more compelling.

For these reasons, the topic of ACEs has increasingly dominated public health debates about how frontline services can respond to instances of childhood adversity and prevent the circumstances which contribute to them. Common frontline activities include trauma-informed care, which aims to increase practitioners' awareness of the negative impact of trauma, so that they can reduce any trauma individuals might inadvertently experience through routine services. Universal ACE screening is also used by many frontline agencies to increase public awareness of childhood adversity and to help individuals access appropriate support. In some cases, this screening is used to produce an 'ACE score', which reflects the number of ACEs experienced before the age of 18.

Over the past five years, governments have increased their investment in these activities with the aim of preventing or reducing ACEs at the population level. For example, the US state of California has recently committed \$95 million to implement state-wide ACE screening through GP services. In the UK, the Welsh, Scottish and Northern Ireland governments are implementing training in trauma-informed care for a wide variety of frontline workforces.

In 2018, a House of Commons science and technology committee inquiry was held to examine the evidence linking ACEs to poor adult outcomes, and to consider the role of early intervention in preventing and reducing ACEs. The inquiry took evidence from a range of experts and organisations, including EIF. While there was strong consensus that ACEs were harmful and associated with a range of negative adult outcomes, there was also scepticism about the strength of this relationship and the extent to which current practice responses, including routine ACE screening, are effective or appropriate.

The committee concluded that there was ‘a clear correlation between suffering adversity in childhood and experiencing further negative outcomes in later life’ and recommended that the government ‘ensure that it is making the most of the opportunity for early intervention to effectively and cost-effectively address childhood adversity and trauma, and the long-term problems associated with such experiences’. Additionally, the committee advised that progress could only be made if there was clear and robust evidence about the nature of ACEs and their impact on children’s development. The committee report also encouraged joined-up working across academic fields to develop this evidence base.

Aims of the review

A primary aim of this review is to respond to the science and technology committee’s recommendations by examining the ACE evidence base in terms of its quality and the conclusions which have followed. A second aim is to consider the strength of evidence underpinning common responses to ACEs, including routine ACE screening and trauma-informed care. In doing so, this report will answer the following questions:

- What do we know about the 10 original ACE categories in terms of their prevalence and co-occurring risks?
- How robust are the methodologies used to investigate ACEs? Are there other methods which may be more appropriate?
- How strong is the evidence linking ACEs to negative adult outcomes? To what extent has a causal relationship been established?
- What biological and social processes link ACEs to negative adult outcomes? Is knowledge of these processes adequate to inform the design and provision of effective interventions and services?
- What do we know about the effectiveness of common responses to ACEs, including routine ACE screening and trauma-informed care? What is the effectiveness of other kinds of interventions and what is their combined potential for preventing and reducing ACEs?

Methodology

Hand-search methods involving indexed journals were used to identify the most recent research on ACEs, as well as child maltreatment and family dysfunction more generally. These methods included:

- a review of the findings from ACE studies, as well as child maltreatment prevalence studies conducted in the UK and US since the mid-1980s
- a review of the evaluation evidence considering the feasibility of routine ACE screening and trauma-informed care, and their impact in reducing child trauma and improving family outcomes
- evidence gathered from the EIF Guidebook about interventions which aim to either prevent ACEs from occurring in the first place or respond to ACE-related trauma
- interviews with representatives from Public Health England, Wales and Scotland, prominent children’s charities, independent health organisations and academics.

What do we know about the prevalence of ACEs and their co-occurring risks?

It is clear that ACEs are prevalent. Case in point: over 80% of the 399,500 children who were identified as being in need in England last year had experienced at least one ACE. This means that at least 2.5% of all children living in England are experiencing some form of maltreatment or family dysfunction at any given point in time. We also know that this statistic reflects only the tip of the iceberg, since the majority of child maltreatment cases go unreported.

Retrospective surveys with adults, by contrast, inform us that at least 10% will have experienced some form of abuse during their childhood. They also tell us that 10% or more of the population will have experienced four or more ACEs before the age of 18. However, these findings do not show us the extent to which these reports overlap – are they the same 10% or do they represent different vulnerable groups? – nor do we know much about other risks these groups of children might be experiencing.

It is also clear that ACEs occur in clusters and do so in predictable ways. If a child is experiencing physical abuse, they are at far greater risk of experiencing psychological abuse, as well as witnessing domestic violence. However, we know extremely little about the prevalence of these various clusters. While 10–15% of the population may have experienced four or more adverse experiences during their childhood, we do not know the number of children exposed to high levels of abuse and family conflict because they are raised in households with multiple adversities, in comparison to those who are chronically neglected because one parent had a mental health problem and the other lived far away. While both sets of circumstances increase the risk of negative adult outcomes, the number of children existing within each of these clusters remains unknown.

Despite the frequency of ACEs, it is clear that a significant proportion of adults will report experiencing very few or no ACEs. This is good news, but it creates challenges for identifying the children who are most likely to benefit from effective interventions.

We therefore need to improve our estimates of the prevalence of ACEs, so we know who the most vulnerable children are and can make interventions available to them as and when needed.

How robust are the methodologies used to investigate ACEs? Are there other methods which may be more appropriate?

Collecting accurate information about child maltreatment and associated risks is extremely difficult. This is because caregivers are reluctant to report abuse for fear of criminal prosecution, and adults are often poor at recalling experiences of abuse. This means that much of what we know about ACEs may either under- or overestimate the scale of the problem.

Four methods are commonly used to collect information about child maltreatment and other forms of family dysfunction.

- **Service records** consist of information routinely collected by frontline services. Such records provide accurate information about service use related to abuse, neglect and other family adversities. However, given that most abuse and neglect is unreported, service records systematically underestimate the number of children with a history of child maltreatment and other ACEs.

- **Prospective cohort studies** make use of longitudinal designs, whereby a large, representative sample of families with children born in the same year are tracked at regular intervals, typically starting in the year of the child's birth and continuing until at least their 18th birthday. These studies provide the most robust method of understanding the potential relationship between childhood experiences and later adult outcomes. However, they take a long time to complete and are also prone to bias in terms of under-reporting.
- **Retrospective cross-sectional surveys** involve asking a representative sample of adults to recall their childhood experiences of ACEs. The majority of ACE studies are conducted in this manner, with the advantage being that experiences of abuse and neglect are in the past, and there is lower risk of prosecution ensuing. However, studies repeatedly show that adults can have difficulty remembering their experiences of abuse, suggesting that their memories are highly influenced by their current circumstances. This means that retrospective studies can both under- and overestimate the prevalence of ACEs in ways which are not fully known.
- **Concurrent cross-sectional surveys** involve asking a cross-section of children and parents (with children under the age of 10) to report their adverse experiences. This methodology overcomes many of the recall biases inherent in retrospective designs, as computer-assisted methodologies are used to help children (and parents of children) report on events that have occurred in the recent past. Concurrent surveys can be further strengthened through anonymous linking to administrative service records, which has the advantage of allowing survey findings to be compared to outcomes occurring after the timescale of the initial study. As a result, concurrent surveys are useful for measuring change in prevalence over time, as well as considering the longitudinal impact of various adversities. Concurrent surveys with children must nevertheless be conducted within rigorously enforced ethics protocols, which balance the participant's right to confidentiality, while at the same time ensuring that experiences of abuse and neglect are investigated if they are disclosed.

The Office for National Statistics is currently considering the feasibility of conducting another comprehensive prevalence survey. **Given that robust population-surveillance data is essential for designing and targeting effective interventions, we recommend that methods be introduced which permit concurrent ACE surveys to be conducted with children at the national level on a regular basis.**

How strong is the evidence linking ACEs to negative adult outcomes? To what extent has a causal relationship been established?

Over the past 20 years, ACE studies consistently confirm that the greater the number of ACEs experienced before the age of 18, the greater the chance of poor adult outcomes. The strength of this 'dose-response' relationship varies, however, depending on the adult outcome under investigation. Findings from a recent systematic review of all ACE studies completed since 1998, for instance, observed that experiencing four or more ACEs, in comparison to experiencing no ACEs, typically:

- doubles the risk¹ of obesity, physical inactivity and diabetes
- triples the risk of smoking, cancer, heart disease or respiratory disease

¹ The term 'risk' is used to reflect a relative increase in risk, as calculated by a risk ratio or adjusted odds ratio – see Dicker, R. C., Coronado, F., Koo, D., & Parrish, R. G. (2006). *Principles of epidemiology in public health practice*, 3rd edition.

- quadruples the risk of sexual risk-taking, mental health problems and problematic alcohol use
- increases the risk of problematic drug use and interpersonal and self-directed violence by seven-fold.

It is clear that high levels of adverse experiences occurring in childhood significantly increase the chances of a number of negative outcomes in adulthood. However, it is important to note that the *absolute size* of many of these risks remains relatively small. For example, the original ACE study observed that four or more ACEs increases the risk of intravenous drug use by 10-fold. This is based on findings showing that 0.3% of those with a history of no ACEs engaged in intravenous drug use, in comparison with 3.5% of those with four or more ACEs. Nevertheless, 96.5% of those who had experienced four or more ACEs *did not* use drugs intravenously, demonstrating that while significant, the relationship between ACEs and intravenous drug use is not deterministic.

More broadly, these findings show that the relationship between ACEs and risky sexual behaviour, mental health problems and problematic substance misuse is strong in comparison to the relationship with physical health outcomes. Moreover, studies also show that the relationship between ACEs and poor physical health weakens considerably when more robust, prospective study designs are used and when other negative childhood circumstances, such as economic disadvantage, are statistically considered.

There is also strong evidence that other negative childhood circumstances, which covary with the 10 traditionally defined ACEs, predict negative adult health outcomes. For example:

- low birth weight has been found to increase the risk of having a stroke before the age of 50 by 200%
- a childhood disability increases the risk of problematic drinking in adults by over 80%
- bullying during the teenage years increases the risk of an adult mental health problem by more than 50%
- childhood experiences of social discrimination have been found to increase the risk of adult mental health problems by over 200%.

Additionally, studies show that low family income may be a stronger predictor of some physical health outcomes than many of the traditional ACE categories. For example, findings from a recent US survey conducted concurrently with teenagers observed that family income was, in fact, more strongly associated with poor physical health in adulthood than all of the ACE categories with the exception of having a family member with a mental health problem.

Collectively, these findings suggest that the graded relationship observed between ACEs and negative physical outcomes is not as strong as the relationship between ACEs and negative mental health outcomes. The implication is that prevention efforts targeting ACEs may help to reduce mental health problems, but may have less impact on physical health outcomes.

These findings additionally show that ACEs are not the only contributor to poor adult outcomes and that a variety of other negative childhood circumstances also significantly predict poor physical and mental health. An unintended consequence is that an over-reliance on the original ACE categories could obscure or minimise our understanding of the impact of other childhood adversities. **Future population studies should look beyond the original ACE categories to consider the combined impact of multiple negative childhood circumstances on adult outcomes, ideally through prospective study designs involving large, representative samples.**

What are the biological and social processes which potentially link ACEs to negative adult outcomes? Is knowledge of these processes sufficient to inform the design and provision of effective interventions?

The ACE study authors originally assumed that the link between ACEs and negative adult outcomes could be explained by increases in health-harming behaviours that were used by teenagers and young adults to cope with higher levels of trauma-related stress. Indeed, the first ACE study observed that a history of four or more ACEs more than doubled the risk of smoking, quadrupled the risk of intravenous drug use, and increased the risks of problematic drinking by seven-fold and intravenous drug use by 10-fold. The findings therefore supported the conclusion that four or more ACEs increased the risk of health-harming behaviours, which in turn reduced individuals' resistance to life-threatening diseases.

Subsequent studies involving more rigorous, prospective designs, have confirmed these findings. However, these studies also find that health-harming behaviours typically explain only half of the statistical relationship between ACEs and poor physical outcomes, meaning that other processes are also involved. A number of complementary theoretical accounts have therefore been proposed to explain how ACEs might impact children's physical and mental health. Accounts focusing on toxic stress, latent vulnerability and epigenetic modulation are particularly well known.

- **Toxic stress** has been defined as an extreme form of stress that occurs when individuals are exposed to high levels of adversity and trauma on an ongoing basis. In these situations, increases in stress can result in the overproduction of cortisol in a way that potentially damages important physiological systems. Preliminary findings from studies conducted with animals and children suggest that this damage may include disruptions to the neural networks which govern the development of the autoimmune system, as well as regions of the brain responsible for memory. Over time, these disruptions may weaken the immune system, decreasing children's resilience to disease and negatively impacting their ability to manage their stress response.
- Models of **latent vulnerability** consider how exposure to childhood maltreatment potentially alters brain functioning and information processing so that children are more vulnerable to mental health problems as they mature. Preliminary findings from brain-imaging studies suggest that abuse and neglect may lead to adaptations or 'calibrations' in a range of neurocognitive systems, including those which govern threat processing, reward processing and autobiographical memory processing. While these calibrations may be beneficial for coping within adverse environments, studies show they may also increase children's susceptibility to anxiety and other mental health problems in later life.
- **Epigenetic modulation** considers how environmental experiences contribute to changes in the expression of the genetic code. Support for epigenetic modulation in response to stress comes from rat studies, which show that pups reared in low-nurturing environments have greater reactivity to stress than pups raised in high-nurturing environments. In particular, high levels of maternal licking after rat pups are stressed has been verified to trigger alterations in the genetic code which govern the pups' reactivity to stress. This increased reactivity may in fact be adaptive in the absence of a nurturing caregiving environment but may also reduce their resilience to disease by the time they reach adulthood.

While these three accounts provide some explanation of how ACEs potentially get 'beneath the skin' to negatively influence children's development, we must bear in mind that the evidence underpinning them is highly preliminary, and currently provides limited insight into how and when to intervene.

In the meantime, there is robust evidence for a number of social processes which link ACEs to negative adult outcomes. Examples of three social processes linking ACEs to poor adult outcomes include:

1. coercive family interactions, whereby aggressive and abusive behaviours are learned and reinforced
2. processes which increase children's vulnerability to polyvictimisation, through increased exposure to multiple forms of abuse perpetrated by peers and adults outside of the family home
3. a lack of positive social interactions with trusted peers and adults that support children's resilience by increasing their sense of self-worth and efficacy.

These social processes are complementary to the biological mechanisms described above, and there is robust experimental evidence showing that they are preventable and treatable. In the meantime, it makes sense **to increase the availability of interventions with known evidence of stopping and reducing the social mechanisms of ACEs, while neurobiological investigations continue.**

What is the potential of routine ACE screening and trauma-informed care for preventing and reducing ACE-related trauma? Are other effective interventions available and what is their combined potential for preventing and reducing ACEs?

When the ACE study was first published, the authors concluded that comprehensive strategies, involving universal, selected and targeted interventions, were necessary to prevent and reduce ACEs. These strategies included intensive home visiting interventions for vulnerable families, school-based programmes aimed at preventing health-harming behaviours, and targeted psychotherapeutic treatments designed to help children and parents cope with ACE-related trauma.

Unfortunately, this comprehensive package of evidence-based care is currently not in widespread use. Instead, governments and health agencies have invested more heavily in routine ACE screening activities and trauma-informed care.

Routine ACE screening

ACE screening, also referred to as routine enquiry, involves using items from the original ACE questionnaire to ask children and adults about their history of ACEs, frequently resulting in an 'ACE score'. This practice was informed by anecdotal evidence suggesting that the scores were useful in raising the patients' awareness of ACEs. It also provided a therapeutic opportunity for patients to discuss their previous adverse experiences with their healthcare providers.

A growing number of frontline service providers now routinely ask patients about their adverse childhood experiences to increase awareness about the impact of ACEs on their wellbeing and discuss options for further treatment if needed. Relatively few of these activities have been rigorously tested, however. What we do know from these studies is that while participants who have not experienced adversity don't mind being asked ACE questions, those experiencing high numbers of ACEs are less comfortable with such questions. Practitioner views are also mixed, with some viewing ACE scores as useful for initiating conversations about adversity, while others question the value of the practice in the absence of additional, evidence-based support.

Recently, the Child Trends Research Center in the US has identified a set of concerns they believe should be addressed before ACE screening is implemented more widely.

1. The accuracy and diagnostic sensitivity and specificity of ACE screening must be established. The tool has been criticised for not covering other important adversities that also increase children's exposure to trauma, while including categories which may be less significant for some children. We therefore do not yet know the extent to which the tool risks missing children who need support, while at the same time falsely identifying children who may not benefit from it. More needs to be known about the accuracy of ACE scores, and the appropriateness of various score cut-offs or thresholds, particularly for predicting need in differing age groups.
2. The extent to which experiences of adversity predict psychological symptoms, including those associated with trauma, is not fully understood. More also needs to be known about the extent to which the most vulnerable children and families find ACE screening to be acceptable.
3. We need to determine if ACE screening practices represent the most efficient way of understanding adversity, or if other methods of inquiry are better. For example, to what extent do ACE screening tools improve practice decisions over the information gained through empathetic conversations with trained and supervised practitioners? More rigorous testing is also required to determine that ACE screening does not inadvertently cause harm, stigmatisation or discrimination.
4. Guidelines for the implementation of ACE screening practices must be developed and tested. Currently, most ACE screening practices do not comply with the World Health Organization's standards for screening implementation.
5. Screening activities currently do not include protocols which ensure that a strengths-based approach, which considers ACEs within the context of factors which support children's resilience, is adopted.
6. ACE screening should be embedded in a care pathway leading to further, evidence-based intervention if needed. Screening in the absence of such pathways is otherwise considered by many to be unethical. In the UK, given that child and adolescent mental health services (CAMHS) and other mental health resources are stretched already, providing evidence-based support may currently be difficult.

Trauma-informed care

Trauma-informed care aims to reduce the stress associated with ACE-related trauma and increase children's resilience. The primary aim of trauma-informed care is to increase practitioners' awareness of how trauma negatively impacts children and adults, and to reduce practices that might inadvertently retraumatise clients. Trauma-informed care also aims to increase practitioners' sensitivity so that users perceive them to be trustworthy and feel safe to disclose traumatic experiences.

A wide range of activities are offered under the guise of trauma-informed care. These activities include training about the potential impact traumatic experiences can have on the immune and nervous systems, advice on how practitioners can form a more trusting relationship with individuals, and service redesigns which aim to create a sense of safety and increase client choice and control.

Various forms of trauma-informed care have undergone feasibility testing, and one randomised control trial has been completed in the US. Findings regarding the feasibility of trauma-informed care have been mixed, providing preliminary evidence of increased client satisfaction, improvements in children's symptoms of trauma and increased placement stability. However, it can also be expensive to implement, and concerns have been raised

about the lack of specificity in many trauma-informed care models. **Increased specification and further rigorous testing are therefore necessary before the potential of trauma-informed care for reducing symptoms of trauma can be fully understood.**

A comprehensive public health approach involving evidence-based early interventions

The first ACE study concluded with recommendations for adopting a comprehensive public health strategy involving evidence-based interventions that would be offered at the universal, selected and targeted levels. We conclude this report by doing the same.

In table S1, we provide the details of 33 interventions with current robust evidence of preventing at least one of the 10 original ACE categories, reducing the health-harming behaviours associated with ACEs, and specifically reducing ACE-related trauma. These activities represent 10 separate intervention models that can be offered at the universal, targeted selective and targeted indicated level. While this list is by no mean exhaustive, it includes a wide range of interventions with proven evidence to prevent or reduce the impact of ACEs at the population level if offered in combination. **We believe that if these evidence-based interventions were integrated into a comprehensive public health strategy developed in response to population needs, many ACEs could be prevented or substantially reduced.**

Although we recognise that these activities will not entirely eradicate ACEs, we believe that they represent a tested and feasible way of preventing and reducing them at the population level. Nevertheless, it is also clear that the effectiveness of these interventions will be limited unless they are embedded within public health policies which systematically address the wider societal determinants of health, including poverty, unemployment and discrimination.

TABLE S1

Interventions listed on the EIF Guidebook with robust evidence of preventing ACEs, reducing ACE-related symptoms or stopping the social mechanisms which contribute to ACEs

All interventions listed here have been assessed by EIF as having level 3 evidence or higher. Level 3 evidence is the threshold at which causality can be attributed to the intervention model through robust evaluation methods involving random assignment or similarly rigorous quasi-experimental designs. Level 4 evidence suggests that this evidence has been established in more than one study and that there is clear evidence of a long-term outcome. More information about the EIF Guidebook evidence standards can be found here: <https://guidebook.eif.org.uk/>

Intervention name	Description	Age range (years unless stated)	Model	Outcomes
Universal activities: Can be provided to all children and families, regardless of level of need. The impact of universal activities is primarily preventative. No screening or prereferral is necessary for children or parents to participate.				
Universal screening				
1 Perinatal mental health screening	Routine screening of mothers for mental health problems throughout pregnancy and the postpartum period.	Perinatal	Screening	2–9% reductions, in the risk of depression at follow-up (3–5 months) after participation in programs involving depression screening, with or without additional treatment components, compared with usual care. A 34% reduction in remission in depression symptoms when screening leads to referral of CBT.
2 Domestic violence screening	Routine screening for intimate-partner violence during the antenatal period.	Perinatal	Screening	Routine antenatal screening for intimate partner violence has been found to increase mothers' safety and improve childbirth outcomes when combined with evidence-based therapies aimed at increasing mother and child safety.
Co-parenting interventions				
3 Family Foundations	A group-based programme for couples expecting their first child where couples learn strategies for enhancing their communication, conflict resolution and the sharing of childcare duties. The improvement in interparental relationships, in turn, improves child outcomes.	Perinatal	Group-based	Level 4 evidence of medium improvements in infant soothability ($d = 0.35$ to $.47$), medium reductions in maternal symptoms of depression and anxiety ($d = .56$ and $d = .38$, respectively) and medium to large improvements in co-parenting behaviour and relationship satisfaction ($d = .47$ to $.7$) (Feinberg et al., 2008). Notably, significant reductions in interparental physical violence and parent-child psychological and physical violence were noted six months following intervention completion (Feinberg et al., 2015).
4 Schoolchildren and Their Families	A group-based programme for couples with a child entering primary school. Six couples attend 16 sessions of two hours' duration where they learn strategies for managing their child's behaviour and improving their co-parenting practices.	3–5	Group-based	Level 3 evidence of improved parenting behaviours, parental mood, and child behaviour, as well as reductions in marital conflict immediately after intervention completion. Improvements in couple communication and satisfaction and some child behaviours were observed at a 10-year follow-up.

5	Strengthening Families 10 to 14	A families-based programme that seeks to enhance family protective processes such as effective communication and child resistance to peer pressure as well as reduce family risk.	10–14	Family-based	Level 3 evidence of small ($d = .26$ to $.39$) reductions in alcohol initiation at 1- and 2-year follow-ups, respectively (Spath et al., 1999) small ($d = .33$ and $.35$) reductions in aggressive behaviours at a four-year follow-up (Spath et al., 2000), and significant improvements in academic success at a 6-year follow-up (Spath et al., 2008). A 10-year follow-up additionally reported lower rates of substance use during sex, lower past year number of partners and lower lifetime sexually transmitted diseases (Spath et al., 2014).
School-based interventions aimed at supporting children's social and emotional development and preventing health-harming behaviours					
6	ASSIST (A Stop Smoking in Schools Trial)	Influent students are recruited into a peer support programme where they are taught skills to dissuade their classmates from engaging in smoking in non-judgemental and empathic ways.	12–14	School-based	Level 3 evidence of a 79% reduction in smoking which was sustained at a two-year follow-up (Campbell et al., 2008).
7	Advanced Life-Skills Training	A schools-based curriculum which supports young people's personal self-efficacy and provides them with strategies for resisting tobacco, alcohol and illicit drug use.	11–14	School-based	Level 3+ evidence of a 23% reduction in self-reports of smoking, problematic drinking, marijuana use and illicit drug use at a five-year follow-up (Spath, Randall, Trudeau, Shin, & Redmond, 2008).
8	Friends for Life (health led)	A schools-based curriculum which provides children with cognitive behavioural strategies for managing worrying behaviours and symptoms of anxiety.	7–13	School-based	Level 3 evidence of small reductions ($d = .22$) in reported symptoms of anxiety in low-risk children. No differences were found for high risk children (Stallard et al., 2014).
9	Friends for Youth	A school-based curriculum which uses workbook exercises, role plays, games, activities and quizzes, to help children to develop strategies for managing anxiety and stress.	12–13	School-based	Level 3 evidence of significant reductions in anxiety among young people receiving the intervention in comparison to those who did not.
10	Good Behaviour Game	A schools-based curriculum consisting of short team games designed to encourage prosocial behaviour and reduce disruptive behaviour.	5–11	School-based	Level 3+ evidence of reductions in aggressive and shy behaviour immediately post-intervention. Significant reductions in problematic drinking and antisocial behaviour, as well as a 50% reduction in suicide ideation were observed at a 14-year follow-up (Kellam et al., 2008; Wilcox et al., 2008). These findings have not been replicated in the UK, however (Ashworth et al., 2020).
11	Incredible Years Dinosaur Club	A programme delivered to small groups of children that uses coached play, videos and games to teach self-regulation and problem-solving skills.	4–8	Group-based	Level 3+ evidence of improvements in behaviour at home, at school and with peers and in social competence with peers for those who received the intervention, relative to those who did not (Webster-Stratton & Hammond, 1997).
12	Lion's Quest Skills for Adolescent Behaviours	A schools-based curriculum aimed at teaching cognitive-behavioural skills for building self-esteem and personal responsibility, making better decisions, resisting social influences, and increasing knowledge with regards to drug use and consequences. This is taught using a combination of role play, group work and discussion.	11–14	School-based	Level 3 evidence of 3% and 2.5% reduced lifetime and recent marijuana use, respectively, amongst those who received the intervention relative to those who did not at a one-year follow up (Eisen et al., 2003).

13	PATHs Preschool	A schools-based curriculum promoting emotional and social competencies and reducing aggression and behaviour problems in preschool children.	3–6	School-based	Level 3+ evidence of small improvements in work-related skills, social problem-solving skills and knowledge of emotions (d= .17, d=.14 and d=.13, respectively) immediately post intervention (Morris et al., 2014).
14	PATHs Elementary	A schools-based curriculum promoting emotional and social competencies and reducing aggression and behaviour problems in elementary children.	6–12	School-based	Level 3 evidence from multiple studies showing small to moderate reductions in child behaviour problems, including those associated with bullying lasting for at least two years (Malti, Ribeaud & Eisner, 2011; Ruby & Doolittle, 2010).
15	Positive Action	A schools-based social and emotional learning curriculum delivered through role-play, puppets, stories and activity sheets.	4–15	School-based	Level 3 evidence of a 31% reduction in substance use behaviour and a 36% reduction in violent behaviour after the intervention had been delivered for approximately 3 years (Li, K.-K., et al., 2011).
16	Olweus Bullying Program	A whole-school approach to bullying prevention, involving staff, students, parents, and the community in prevention efforts. For instance, staff receive training on how to intervene when bullying occurs and students receive class meetings focused on bullying prevention, peer relations, and pro-social behaviours.	5–18	School-based	Evidence of small to large reductions (d= .4 to d= 1.9) in reports of being bullied in grades 3 to 10 and moderate to large reductions (d=.76 to d=1.33) in reports of bullying others in grades 4 to 11 (Limber et al., 2018 and Olweus et al., 1991) as well as reduced antisocial behaviour and improved wellbeing and satisfaction with school life (Olweus et al., 2004).
Selective interventions made available to families on the basis of selected demographic risks					
17	Family Nurse Partnership	FNP is a preventative home-visiting intervention for first-time teenage mothers and their children. Home visits begin from the time of the mother's first booking and then last until the child's second birthday.	Antenatal to age 2	Home visiting	FNP has level 4 evidence of improving a variety of child and maternal outcomes from multiple RCTs conducted in North America, Europe and the UK. Findings from a recently completed Dutch trial has specific implications for ACEs, showing a 91% decreased rate of child maltreatment, a 51% reduction in toddler internalising symptoms at age 2 and significant reductions in a variety of forms of domestic violence throughout the duration of the programme. These findings have not been replicated in the UK, however (Robling, Becker, & Butler, 2016).
Targeted interventions made available to children and parents on the basis of a pre-identified need					
Parenting interventions					
18	Empowering Parents/ Empowering Communities (EPEC)	A parenting intervention for disadvantaged families experiencing behavioural difficulties with a child between the ages of two and 11.	2–11	Group-based	Level 3 evidence of moderate reductions in coercive parenting behaviours (effect size = .69), alongside small reductions in problematic child behaviours (effect size = .39).
19	Level 4 Triple P Group & Standard	Enhanced Triple P (level 5) provides adjunctive interventions (alongside a level 4 Triple P programme) to address family factors that may complicate the task of parenting, such as parental mood and partner conflict.	2–5	Individual therapy	Level 3 evidence of significant reductions in coercive parenting behaviours and increasing parenting competence, as well as significant improvements in child behaviour, lasting for over three years (Sanders, Bor & Morawska, 2007).

20	Family Check-up for Children	A family-centred intervention that teaches parents to use parenting practices to support child competence, mental health and risk reduction.	2–5	Home visiting	Level 3 evidence from multiple studies of a reduction in aggressive and destructive behaviour sustained at the 1-year follow-up (Shaw et al., 2006). Additional benefits include improved parent-child interaction and reduced maternal depression (Shaw et al., 2008, 2009; Lukenheimer, 2008; Dishion et al., 2014).
21	Helping the Non-Compliant Child	An intervention that targets parents and their children where they learn how to manage unwanted child behaviour.	3–8	Individual therapy	Level 3 evidence of reductions in symptoms of ADHD and improvements in behaviour amongst children who received the intervention, relative to those who did not (Abikoff et al., 2015).
22	Hitkashrut	A co-parent training intervention aimed at reshaping parent-child interactions to reduce conduct problems.	3–5	Group-based	Level 3 evidence of a medium ($d = .76$) reduction in conduct problems immediately following the intervention, maintained at the 1-year follow-up ($d = .63$). Additionally, there were large ($d = .85$) and medium ($d = .47$) improvements in effortful control and callous/unemotional traits, respectfully, maintained at the 1-year follow-up (Somech et al., 2012). Additionally, parents reported improvements in their marital quality and parenting behaviours (Somech et al., 2016).
23	The Incredible Years Preschool Basic	A group parenting programme where parents learn strategies for interacting positively with their child and discouraging unwanted behaviour through mediated video vignettes, problem-solving exercises and structured practice activities.	3–6	Group-based	Level 4 evidence of medium to large ($d = .63$ and $d = .89$) reductions in number and intensity of conduct problems, respectively (Hutchings et al., 2007). This has been replicated in additional evaluations which identified medium improvements ($d = .31$ to $d = .75$) in child behavior (Scott et al., 2001; Gardener & Klimes, 2006) immediately following completion of the intervention as well as improvements in behavior and reading at 4 to 10 years post-intervention (Scott et al., 2014).
24	The Incredible Years School Age Basic	A group parenting programme that teaches effective parenting strategies for dealing with unwanted behaviour through group discussion, role plays, video vignettes and homework.	6–12	Group-based	Level 3+ evidence of a medium reduction ($d = .52$ and $d = .44$) in conduct problems and ADHD symptoms, respectively, and a halving of diagnosis of oppositional defiant disorder at a four-month follow-up (Scott et al., 2010). Additional parental outcomes included increased use of play, praise and rewards and time out and reduced harsh discipline ($d = .31$ to $d = .59$). Another level 3 evaluation (Webster-Stratton et al., 2004) identified small to medium reductions ($d = .35$ to $d = .67$) in conduct problems at home and at school as well as a large ($d = .81$) reduction in negative parenting and a medium ($d = .51$) increase in positive parenting by mothers.
Interventions for families where the parents are separating					
25	Family Transitions Triple P	Family Transitions Triple P (FTTP) is an intensive intervention that aims to prevent adverse outcomes for children following parental divorce. It can be delivered individually to families or as a group-based intervention.	2–18	Individual or group-based	Level 3 evidence of significant reductions in child behavior problems and coercive parenting behaviours in the first year and improved parental mood and co-parenting skills at the one-year follow-up.
26	New Beginnings	A group-based intervention for separating parents that aims to improve young people's internalising and externalising problems by teaching parents strategies for improving positive family communication and effective discipline.	3–18	Group-based	Evidence of a reduction in externalising and internalising problems when examined immediately after the intervention (Wolchik et al., 2000). Similar results were identified at the six-month follow-up with respect to externalising behaviour while at the 15-year follow up there was a reduction in the development of the internalising problems.

Therapeutic interventions				
27	Trauma-focused Cognitive Behavioural Therapy	A therapeutic intervention for children and families where participants learn cognitive strategies for managing negative emotions and beliefs stemming from highly distressing and/or abusive experiences.	2–18	Individual therapy Level 3 evidence from multiple studies suggesting reductions moderate to strong reductions in symptoms of PTSD, anxiety and depression.
28	Multidimensional Family Therapy	An integrated therapeutic intervention for adolescents and families that also includes an optional community-focused component. It aims to develop problem-solving skills for dealing with issues that are occurring at the level of the adolescent, parent, family and community.	10–18	Individual therapy Level 4 evidence of reductions in externalising symptoms and cannabis dependence symptoms at a nine-month follow-up (Rigter et al., 2013 and Schaub et al., 2014). Additionally, at a 12-month follow-up there is evidence of moderate reductions in substance use problems severity ($d = .59$) and increases in drug abstinence as well as reductions in delinquency, externalising symptoms and felony arrests at an 18-month follow-up (Dakof et al., 2015).
29	Child-Parent Psychotherapy	A therapeutic intervention targeting mothers and preschool children who may have experienced trauma or abuse (e.g. domestic violence) or are otherwise at risk of behavioural and emotional problems.	3–5	Individual therapy Level 3 evidence from multiple studies of medium reductions in symptoms of child trauma (effect size = .63) and small improvements in child behaviour ($d = .24$). Maternal benefits included medium reductions (average $d = .40$) in maternal reports of trauma (Lieberman, Van Horn, & Ippen, 2005).
30	Child First	A 12-month home-visiting intervention combining Child-Parent Psychotherapy with other forms of social support to reduce the risk of child maltreatment in vulnerable families with young children.	6–36 months	Home-visiting Level 3 evidence of four-fold reductions in child behavioural problems and a two-fold reduction in reports of child maltreatment at a three-year follow-up. Also, a three-fold reduction in parenting stress and four-fold reduction in symptoms of psychopathology at a 12-month follow-up (Lowell, Carter, Godoy, Paulicin, & Brigg-Gowan, 2011).
Specialist interventions offered as alternatives to families with a child at the edge of going into care				
31	Functional Family Therapy	A therapeutic intervention for young people involved in serious antisocial behaviour and/or substance misuse and their parents. Participants are taught behavioural strategies and skills including listening skills, anger management and parental supervision techniques to replace maladaptive behaviours (i.e. antisocial behaviour and substance abuse).	10–18	Individual & family therapy Level 3 evidence from multiple studies of reduced substance misuse (Waldron et al., 2001).
32	Multisystemic Therapy	A therapeutic intervention for families with a young person who is at risk of going into care due to serious antisocial and/or offending behaviour. The focus is on using the parents as the primary agents of change, so the intervention includes strategies to improve the parents' effectiveness and the quality of the relationship with their child.	12–17	Individual & family therapy Level 4+ evidence from multiple, internationally conducted studies including a US evaluation demonstrating reduced youth offending, antisocial behaviour and psychiatric symptomatology (Butler et al., 2011; Bourdin et al., 1995) as well as reduced criminal arrests and reduced criminal arrests and family-related civil court cases at a 14- and 22-year follow-up, respectively (Schaeffer et al., 2005; Sawyer et al., 2011). Additionally, an evaluation in Norway found reduced internalising behaviour and reduced delinquency immediately post-intervention, followed by reduced behavioural problems and reduced out-of-home placements at an 18-month follow-up (Ogden et al., 2004, 2006). These findings are not universally upheld, however. For example, a recent UK study observed that while MST reduced self-reported criminal behavior, this improvement was not significantly better than what was achieved by standard youth justice practice (Fonagy et al., 2018).

33	Multisystemic Therapy for Child Abuse and Neglect	An intensive treatment for families who have recently been reported to Child Protection Services. A key aim of the intervention is to help families assume greater responsibility for their behaviours and actively work to resolve serious family issues.	6–17	Individual & family therapy	Level 3 evidence of reduced neglect, psychological aggression, minor and severe assault, non-violent discipline, symptoms of PTSD, dissociative symptoms, internalising symptoms, total behaviour problems and increased placement stability post-intervention (Swenson et al., 2010).
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Note: All interventions listed here have been assessed by EIF as having level 3 evidence or higher. Level 3 evidence is the threshold at which causality can be attributed to the intervention model through robust evaluation methods involving random assignment or similarly rigorous quasi-experimental designs. Level 4 evidence suggests that this evidence has been established in more than one study and that there is clear evidence of a long-term outcome. More information about the EIF Guidebook evidence standards can be found here: <https://guidebook.eif.org.uk/>

Glossary

allostasis	Refers to processes used to maintain equilibrium (or homeostasis) within various physiological systems when challenged by various environmental conditions (ch 5).
clinically significant impairment	Impairment on account of a mental health problem which negatively impacts an individual's daily functioning.
concurrent cross-sectional surveys	A cross-section of children and parents is asked to report their adverse experiences. Concurrent surveys can be further strengthened through anonymous linkage to administrative service records (summary).
dose-response relationship	the more ACEs experienced before the age of 18, the greater the chance of poor adult outcomes (summary).
endocrine system	The endocrine system is the collection of glands that produce hormones that regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep, and mood.
epigenetic modulation	The epigenome regulates when and where genes are expressed (summary).
health-harming behaviours	Behaviours, such as smoking, drinking and illicit drug use (ch 1).
incidence	Proportion or rate of individuals who develop a condition within a particular time period (ch 3).
internal consistency	internal consistency is typically a measure based on the correlations between different items on the same test (or the same subscale on a larger test). It measures whether several items that propose to measure the same general construct produce similar scores.
latent vulnerability (models)	exposure to childhood maltreatment potentially alters brain functioning and information processing so that children are more vulnerable to mental health problems as they mature. While these calibrations may be beneficial for coping within adverse environments, studies show they may also increase children's susceptibility to anxiety and other mental health problems in later life (summary).
maladaptation	An adaptation to external circumstances that may initially be appropriate, but then becomes problematic over time.
metabolic marker	A characteristic that is objectively measured and evaluated as an indication of biological processes associated with health and illness.
neglect	Acts of omission, where the parent or caregiver fails to meet the child's physical or emotional needs (ch 2).
physical abuse	The intentional use of physical force against a child that causes, or has the potential to cause, physical injury (appendix A).
polyvictimisation	Exposure to multiple forms of victimisation in various contexts over the life course (ch 5).
predictive validity	The extent to which a measurement score is predictive of scores on other measures, or the likelihood of a specific event.

prevalence	Proportion of the population who have a condition within a particular time period (ch 3).
prospective cohort studies	Longitudinal designs whereby a large, representative sample of families with children born in the same year are tracked at regular intervals, typically starting the year of the child's birth and continuing until at least the 18th birthday. They take a long time to complete and are prone to under-reporting biases (summary).
psychological abuse	The terms psychological abuse, emotional abuse and emotional maltreatment are used interchangeably to describe intentional adult behaviours which reject, belittle or demean a child's character or competence. Examples of psychological abuse include various forms of verbal abuse (such as name calling or making unkind insinuations), ignoring (such as rejecting, isolating or stonewalling), and intimidation through the use of threats and hostile actions (for example, door slamming or object smashing) (appendix A).
psychological neglect	The caregiver's failure to recognise and respond to the child's psychological and cognitive needs (appendix A).
psychometric properties	Psychometric properties refer to the validity and reliability of the measurement tool.
reliability	The degree to which the result of a measurement, calculation, or specification can be depended on to be accurate and replicable.
resilience	Ability to develop positively despite exposure to significant threat, severe adversity, or trauma that typically constitute major assaults on the processes underlying biological and psychological development (ch 5).
retrospective cross-sectional surveys	A representative sample of adults is asked to recall their childhood experiences of ACEs. Retrospective studies can both under and over-estimate the prevalence of adverse childhood experiences (summary).
risk	The term risk is used to reflect a relative increase in risk, as calculated by a risk ratio or adjusted odds ratio (summary).
sensitivity	Test sensitivity refers to the proportion of actual positives that are correctly identified as such (for example, the percentage of individuals screened for an illness who actually have this illness). Sensitivity is also referred to as the true positive rate.
service records	Information routinely collected by frontline services provide accurate information about service use related to abuse, neglect and other family adversities. Given that most abuse and neglect is unreported, however, service records systematically under-estimate the number of children with a history of child maltreatment and other ACEs (summary).
sexual abuse	child sexual abuse encompasses any form of sexual activity between an adult and child under the age of consent, whether or not it is consensual (appendix A).
social thinning	Refers to child losing the support of peers or adults over time (ch 5).
specificity	Test specificity refers to the proportion of actual negatives that are correctly identified as such. For example, the percentage of individuals screened as not having an illness who do not have the illness. Specificity is sometimes referred to as the true negative rate.
toxic stress	An extreme form of stress which occurs when individuals are exposed to high levels of adversity and trauma on an ongoing basis (summary).
trauma	"Trauma is defined as an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being" (SAMSHA, 2014) (ch 2).
trauma-informed care	The primary aim of trauma-informed care is to increase practitioners' awareness of how trauma negatively impacts children and adults and reduce practices that might inadvertently retraumatise clients. Trauma-informed care also aims to increase practitioners' sensitivity so that users perceive them as trustworthy and feel safe to disclose traumatic experiences (summary).

1. Introduction

Overview

Adverse childhood experiences (ACEs) are traditionally understood as a set of traumatic events or circumstances occurring before the age of 18 that have been consistently shown through research to predict a variety of life-limiting physical and mental health conditions in adulthood. Over recent years, ACEs have become increasingly dominant in public debates about the role of frontline services in responding to children who have been exposed to trauma and preventing the circumstances which contribute to child abuse or neglect. Although the Early Intervention Foundation (EIF) has published several reports relevant to this debate, this is the first time we have systematically examined the evidence related to ACEs and its implications for policy and practice.

In this report, we seek to contribute to the public debate through an examination of the current scientific evidence base. While a primary aim of this work is to improve our understanding of the impact of ACEs on children's development, we must emphasise that we do not do this solely for academic purposes. The childhood adversities we describe in this report represent many forms of child abuse and neglect which are punishable by law in most countries and infringe upon the UN Convention on the Rights of the Child, of which the United Kingdom is a signatory. It is therefore critical to understand the evidence base to make sure that practice responses are as effective as possible and informed by evidence of the highest quality.

1.1 What are ACEs?

The term ACEs (adverse childhood experiences) was first coined in 1998 by the landmark Kaiser Permanente population study to refer to 10 categories of abuse and family dysfunction that reliably predict a variety of poor adult outcomes (Felitti et al., 1998). Although the link between child maltreatment and poor adult outcomes was already well established within the child protection literature, the Kaiser Permanente study was the first to draw attention to the graded relationship which existed between the *number* of adversities experienced before the age of 18 and risk of mental health problems and life-threatening diseases before the age of 60. If an individual had one ACE, the risk of poor adult outcomes was relatively small; if someone had four or more, the risk was comparatively much greater.

Multiple ACE studies ensued, all confirming a similar relationship: while few ACEs represented little risk, four or more substantially increased the risk of adult physical and mental health problems (Hughes et al., 2017). Additionally, the studies observed that ACEs were common and were also associated with a higher likelihood of unemployment and the risk of committing a crime. The implication of these findings was that childhood adversities were causally linked to poor adult outcomes in a way that could be categorised, measured and scored. But if this was true, what was the causal link?

Initially, the authors of the ACE study assumed that this relationship could be explained by a graded relationship which also existed between ACEs and health-harming behaviours, such as smoking, drinking and illicit drug use. However, subsequent studies observed that health-harming behaviours explained only half of the association between ACEs and life-threatening diseases – meaning that other processes were also involved. Evidence from the biological sciences suggested that these other processes potentially involved high levels of continuous and unresolved stress – the kind of stress children experienced when coping with ACEs on a regular basis (McEwen, 2000a). Specifically, studies showed that too much of this chronic stress – or ‘toxic’ stress, as it subsequently came to be known – caused the body to overproduce cortisol, which then exerted wear and tear on the nervous and immune systems (National Scientific Council on the Developing Child, 2005; Shonkoff et al., 2012). Researchers assumed that this wear and tear eventually interfered with the development of important autoimmune processes, thereby weakening the body’s resistance to life-threatening diseases (McEwen, 2000b).

1.2 ACE-related policy and practice

The evidence base for ACEs was therefore seemingly established. Consistent findings from multiple international studies confirmed that there was a graded, dose–response relationship between ACEs and life-threatening diseases and findings from the biological sciences further verified that this relationship could be explained by high exposure to toxic stress. In light of this this consistent and compelling evidence, ACE-related policies and initiatives quickly ensued.

On the research front, policies included guidance on how to collect information on ACEs at the population level on a regular basis. For example, the US Centers for Disease Control (CDC) added the original ACE questionnaire to the Behavioural Risk Factor Surveillance System (BRFSS), so that US states could monitor the prevalence of ACEs on an annual basis. Similarly, the World Health Organization (WHO) established the ACE Global Research Network to determine an international research agenda for understanding how cultural and economic processes possibly contribute to ACEs.

On the practice front, health agencies across the globe began to promote ‘trauma-informed’ strategies that would enable frontline agencies to better support the needs of individuals exposed to ACEs and experiencing symptoms of trauma (SAMSHA, 2014). Many of these strategies included the use of routine screening within frontline services (sometimes referred to as routine enquiry) which provided individuals with an ACE ‘score’ on the basis of the number of ACEs experienced. This was done with the assumption that ACE scores would raise awareness about the negative impact of ACEs and encourage individuals to access support that would reduce any trauma-related symptoms they might be experiencing. Trauma-informed strategies also included ACE training, to increase practitioners’ understanding of the potential biological relationship between childhood trauma and negative adult outcomes (Sweeney, Clement, Filson, & Kennedy, 2016).

Within the past 10 years, individual US states have now started to develop legislation to implement trauma-informed care as a primary strategy for identifying and reducing ACEs. To date, 24 states have passed various forms of legislation pledging a commitment to reducing ACEs through some form of trauma-informed practitioner training (Prewitt, 2019). Some states have also allocated funding for various screening and early intervention activities. For example, the state of California has recently allocated \$95 million to implement state-wide ACE screening through GP services, alongside trauma-informed training for all frontline practitioners (Loudenback, 2019).

Within the UK, each of the four nations have initiated their own ACE-related policies:

- Public Health Wales has been a particular leader in raising ACE awareness through the publication of six reports describing the prevalence of ACEs in England and Wales. The government is also currently offering trauma-informed training to many of its frontline workforces, including health visitors, the housing sector and police force.
- In Scotland, the prevention of ACEs and support for child resilience was identified as a top priority for the 2017/18 and 2018/19 government programme. To this end, the Scottish government has committed £1.3 million to practitioner training and has convened a multi-sectorial ACE hub, to further shape their public health approach to ACEs and other child and adult vulnerabilities (NHS Scotland 2019).
- The Northern Irish government recognises children and young people's resilience to ACEs as a specific government goal. To date, £1.5 million has been committed to develop trauma-informed training so that practitioners working with children and young people can become more ACE-aware.
- In England, the Department for Health and Social Care and the Home Office have developed trauma-informed training materials. Routine enquiry is also being implemented in multiple areas across the country.

In 2018, the House of Commons science and technology committee held an inquiry to examine the quality of evidence underpinning ACE-related activities, as well as to consider the role of early intervention for preventing and reducing ACEs. The inquiry took evidence from a variety of experts and organisations, including EIF. While there was strong consensus that ACEs were harmful and predicted a range of negative adult outcomes, there was also scepticism about the usefulness of various ACE-related activities, including routine ACE screening. Additionally, there was criticism that the ACE narrative was overly deterministic in its portrayal of the relationship between ACEs and negative adult outcomes, and that the case for a causal link between ACEs separate from other negative childhood circumstances – such as poverty, poor housing and community deprivation – had not been made.

Nevertheless, the committee concluded that there is 'a clear correlation between suffering adversity in childhood and experiencing further negative outcomes in later life' and recommended that the government 'ensure that it is making the most of the opportunity for early intervention to effectively and cost-effectively address childhood adversity and trauma, and the long-term problems associated with such experiences'. Additionally, the committee advised that progress could only be made if there was clear and robust evidence about the nature of ACEs and their impact on children's development and encouraged joined-up working across academic fields to develop this evidence base.

1.3 Aims of this evidence review

In this report we respond to the science and technology committee's recommendations by examining the evidence underpinning ACEs in terms of its quality and the conclusions which have followed. We also consider the strength of evidence underpinning common ACE-related activities, including routine ACE screening and trauma-informed care, in order to better understand the potential of these activities for reducing symptoms of trauma and preventing ACEs from occurring in the first place. These aims are addressed through five chapters which focus on individual elements of the ACE evidence base.

- Chapter 2 summarises what we know about the prevalence of the original 10 ACE categories, and the extent to which they co-occur.
- Chapter 3 considers the strengths and limitations of the methodologies used to estimate the prevalence of ACEs.

- Chapter 4 summarises what is known about the association between ACEs and adult physical and mental health outcomes.
- Chapter 5 summarises current theories involving various biological and social processes which potentially link ACEs to poor physical and mental adult outcomes.
- Chapter 6 considers the strength of evidence underpinning various practice responses to ACEs, including routine ACE screening and trauma-informed care. This chapter also describes how ACEs might be prevented or reduced through a tiered public health strategy providing evidence-based support.
- Chapter 7 concludes with a summary of key messages and the implications for future ACE-related policy and practice.

2. What we know about adverse childhood experiences

Overview

What are ACEs? And how are they related to other childhood circumstances? Although the answers to these questions may seem obvious, there is in fact wide variation in how childhood adversities are defined and measured. Precise definitions are necessary, however, to understand the prevalence of ACEs, as well as the circumstances which predict them. This knowledge is also essential for maximising the effectiveness of interventions, and for making sure they reach the families who need them most.

In this chapter, we answer these questions first by considering how childhood adversities are defined within conventional ACE studies. We then examine the prevalence of each of the 10 ACEs, the extent to which ACEs co-occur and the risk factors which contribute to their co-occurrence. We conclude by considering the implications of these findings for informing the development and implementation of effective interventions.

2.1 The original ACE categories

As described in chapter 1, ACEs are a set of 10 traumatic events or circumstances occurring before the age of 18 that have been consistently shown through research to predict a variety of poor physical and mental health outcomes. This link was first identified through a survey completed by 17,421 Kaiser Permanente employees in Southern California who had recently undergone a standard medical examination (Felitti et al., 1998; Anda et al., 2006).

The original ACE studies defined childhood adversity in terms of five categories of child maltreatment and five serious family difficulties. The original ACE questions and associated definitions¹ are provided in table 2.1. Further details about these definitions and the way they may vary across studies is provided in appendix A.

The first five ACE categories entail various forms of child maltreatment perpetrated by a parent or other caregiver who has direct responsibility for the child. Physical, sexual and psychological abuse are all recognised as acts of *commission*, where the perpetrator specifically intends to cause harm. By contrast, physical and emotional neglect are viewed as acts of *omission*, where the parent or caregiver fails to meet the child's physical or emotional needs (Gilbert et al., 2009). These categories also vary in terms of their duration (for example, chronic versus episodic occurrence) and the extent to which they represent wilful intent on the part of the caregiver.

¹ Definitions of child abuse and neglect are those used by US Centers for Disease Control (2008) and World Health Organization (2016). Definitions of family dysfunction are provided by Kaslow (1996).

The second five ACE categories represent various family difficulties which frequently co-occur with child abuse and neglect and children's exposure to trauma. While the original ACE study did not offer a specific definition of trauma, a working definition has subsequently been agreed through an international consensus exercise led by the US Department of Health and Human Services:

"Trauma is defined as an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being."

SAMSHA, 2014

2.2 The prevalence of ACEs

Measuring the prevalence of ACEs with any precision is incredibly difficult. This is partially because of variations in the definitions used for child maltreatment and serious family difficulties, but also because of measurement biases, which we will describe in greater detail in chapter 3. Table 2.1 (over) summarises what we currently know about the prevalence of each of the ACE categories from recent cross-sectional population surveys conducted with children and adults in the UK.

Information about the incidence of reported cases of child abuse and neglect is collected annually by the Department for Education. In 2019, most referrals were made by the police (29%), followed by schools (18%) and health services (15%; DfE, 2019). These figures represent a downwards trend since 2013, although it must be kept in mind that this trend may also reflect changes in reporting practices, rather than absolute changes in rates. As we describe in chapter 3, these numbers represent only the 'tip of the iceberg' of what we know, as most circumstances involving child abuse and neglect go unreported, regardless of reporting practices (Gilbert et al., 2009).

TABLE 2.1: DEFINITIONS OF CHILD MALTREATMENT AND SERIOUS FAMILY DIFFICULTIES IDENTIFIED AS ADVERSE CHILDHOOD EXPERIENCES*

	Category	Definition	Definition	Episodic/ chronic	Preval. (Ashton, 2016)	Preval. (Radford et al., 2011)
Acts of commission	Physical abuse	Did a parent or other adult in the house often ... Push, grab, slap or throw something at you? Or Ever hit you so hard that you had marks or were injured?	Physical abuse entails the intentional use of physical force against a child that results in, or has the potential to result in, physical injury (CDC, 2008; Barnett, Manly, & Cicchetti, 1993). Includes acts ranging from those which do not leave a physical mark to those which cause permanent disability, disfigurement or death. May result from discipline or physical punishment.	Episodic	17%	8.4%
	Sexual abuse	Did an adult or someone at least five years older than you ever ... Touch or fondle you or touch your body in a sexual way? Or Try to or actually have oral, anal or vaginal sex with you?	Sexual acts include contact involving penetration, however slight, between the mouth, penis, vulva or anus of the child and another individual. Sexual acts also include penetration, however slight, of the anal or genital opening by a hand, finger or other object (CDC, 2008; Basile & Saltzman, 2002). Sexual acts can be performed by the caregiver on the child or by the child on the caregiver. A caregiver can also force or coerce a child to commit a sexual act on another individual (child or adult).	Episodic	10%	1%
			Abusive sexual contact includes intentional touching, either directly or through the clothing, but not involving penetration. Abusive sexual contact can be performed by the caregiver on the child or by the child on the caregiver. Abusive sexual contact can also occur between the child and another individual (adult or child) through force or coercion by a caregiver. Abusive sexual contact does not include touching required for the normal care or attention to the child's daily needs.			
		Not covered in the original ACE questionnaire	Noncontact sexual abuse involves exposing the child to sexual activities, not including physical contact of a sexual nature between the caregiver and the child. Examples of noncontact sexual abuse include exposure to sexual activity through pornography, voyeurism or adult exhibitionism, filming a child in a sexual manner, harassment, prostitution and exploitation.			

Acts of commission	Psychological abuse	<p>Did a parent or other adult in the house often ...</p> <p>Swear at you, insult you, put you down or humiliate you?</p> <p>Or</p> <p>Act in a way that made you afraid you might be physically hurt?</p>	Psychological abuse is intentional caregiver behaviour that conveys to a child that he/she is worthless, flawed, unloved, unwanted, endangered or valued only in meeting another's needs (CDC, 2008; Barnett, Manly, & Cicchetti, 1991). Examples of psychological abuse include blaming, isolating, ignoring or spurning in a manner that is harmful or insensitive to the child's developmental needs or can damage the child psychologically or emotionally.	Chronic	23%	7%
	Neglect (Failure to provide)	<p>Did you often feel that ...</p> <p>You didn't have enough to eat, had to wear dirty clothes and had no one to protect you?</p> <p>Or</p> <p>Your parents were too drunk or high to take care of you or take you to the doctors if you needed it?</p>	Physical neglect , where the caregiver fails to provide adequate nutrition, hygiene, shelter or fails to provide clothing that is adequately clean, appropriate size or adequate for the weather (Barnett, Manly, & Cicchetti, 1993; Centers for Disease Control, 2008).	Chronic	Not reported	16%
Acts of omission		<p>Did you often feel that...</p> <p>No one in your family loved you or thought you were important or special?</p> <p>Or</p> <p>Look out for each other, feel close to each other or support each other?</p>	Psychological neglect involves the caregiver ignoring the child, or not responding to the child's emotional needs. Examples of emotional neglect involve the caregiver not responding to infant cries or older child's attempt to interact. May deny the child access to mental health care when needed.		Not reported	Not reported
		Not covered in the original ACE questionnaire	Medical/dental neglect involve the caregiver not providing adequate access to medical, vision or dental care for the child.			
		Not covered in the original ACE questionnaire	Educational neglect entails the caregiver not providing the child with adequate access to education. Examples of educational neglect involve enrolling the child in school or encouraging a child (under 16 years of age) to drop out of school.			
	Neglect (Failure to supervise)	Not covered in the original ACE questionnaire	<p>Inadequate supervision is failure by the caregiver to ensure that the child is safe. Caregiver does not take care to ensure that the engages in safe activities and uses appropriate safety devices; is not exposed to unnecessary hazards; or to ensure appropriate supervision by an adequate substitute caregiver.</p> <p>Can also include occasions when a caregiver knowingly fails to protect a child from maltreatment perpetrated by a substitute caregiver.</p>			

Family dysfunction	Exposure to domestic abuse	Was your mother or stepmother ... Often pushed, grabbed, slapped or had something thrown at her? Or Sometimes or often kicked, bitten, hit with a fist or hit with something hard? Or Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?	Exposure to domestic abuse (also defined as exposure to violent environments) involves the caregiver intentionally failing to take measures to protect the child from pervasive violence within the home, neighbourhood or community. Exposure of a child to violence between caregivers in the home may also qualify as exposure to a violent environment, particularly if the caregivers do not take available measures to protect the child from exposure. But, in instances where the caregiver is being victimised by a partner, and alternatives to protect the child are not available, or the caregiver is unaware of alternatives, the caregiver is not maltreating the child (see witnessing partner violence below) (CDC, 2008; Kairys & Johnson, 2002).	Episodic	16%	17.5%
	Family member with mental illness	Was a household member depressed or mentally ill or did a household member attempt suicide?	A mental illness is a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation or behaviour that reflects a dysfunction in the psychological, biological or developmental processes underlying mental functioning (American Psychological Association, 2013). Examples of parental mental illness include ongoing depression, anxiety disorders, schizophrenia, eating disorders and addictive behaviours.	Chronic	14%	17%**
	Family member who misuses substances	Did you live with anyone who was a problematic drinker or alcoholic or used street drugs?	Parental substance misuse encompasses maladaptive patterns of drinking/drug use, leading to clinically significant impairment or distress, as manifested by at least one related problem in a 12-month period (APA, 2013). Examples of parental substance misuse include harmful, hazardous or binge drinking or the misuse of prescription or illicit drugs which may or may not be part of an ongoing addiction.	Chronic	14%	2.3–19%***
	Caregiver incarceration	Did a household member go to prison?	Caregiver incarceration refers to any kind of custodial confinement of a parent by the criminal justice system, except being held overnight in police cells (Murray, Farrington, & Sekol, 2012). Can refer to confinement in jails or prisons relating to suspicion of having committed a crime.	Chronic	5%	2%****
	Parental separation or divorce	Were your parents ever separated or divorced?	Parental separation encompasses circumstances where the child's biological, adopted or step-parents are no longer living together because of a breakdown in the relationship. Pertains to separations involving caregivers living apart in the same or different communities. Separation may have occurred prior to the child's birth and may be temporary or permanent.	Chronic	20%	No reliable estimate

* Figures reported in table 2.1 are from a recent cross-sectional study conducted retrospectively with adults living in Wales (Ashton, Bellis, Hardcastle, & Hughes, 2016) and findings from the most recent NSPCC prevalence survey conducted with children and families in 2011 (Radford et al., 2011). The large discrepancies in these findings are in part due to methodological differences, involving the definition of ACEs, as well as the survey design, described in chapter 3.

** From the Adult Psychiatric Morbidity Survey, 2014, McManus, S., Bebbington, P., Jenkins, R., & Brugha, T. (2016). Mental health and wellbeing in England: Adult Psychiatric Morbidity Survey, 2014. A survey carried out for NHS Digital by NatCen Social Research and the Department of Health Sciences, University of Leicester.

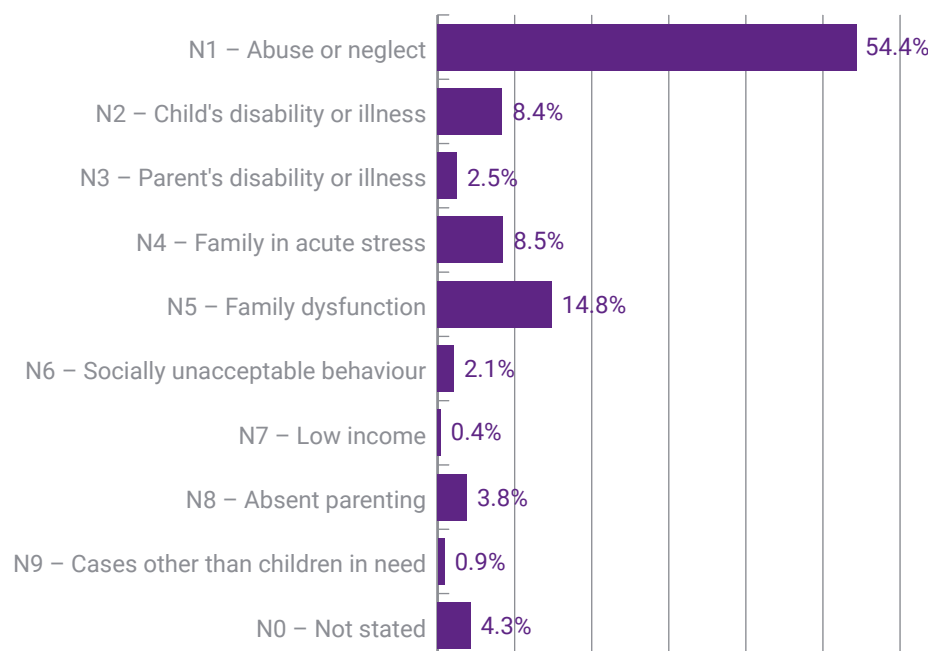
*** From the Adult Psychiatric Morbidity Survey, 2014; figures range from 2.3% for dependent use to 19% for hazardous use.

**** Williams, Papadopoulou, & Booth (2012).

These figures tell us that ACEs are prevalent, with abuse or neglect being implicated in over half (54.4%) of the 399,500 cases of children identified as being in need, representing approximately 2.5% of the child population at any given time.² These figures also make clear that a significant number of children in need are experiencing other serious family difficulties, including acute family stress (8.5%), having a caregiver with a mental illness or physical disability (2.5%) and high levels of family dysfunction (14.8%) (figure 2.1). Collectively, at least 80% of the 399,500 children identified as being in need in 2019 had at least one ACE-related problem.

FIGURE 2.1

Percentage of children in need in England at 31 March 2019, by primary need at assessment



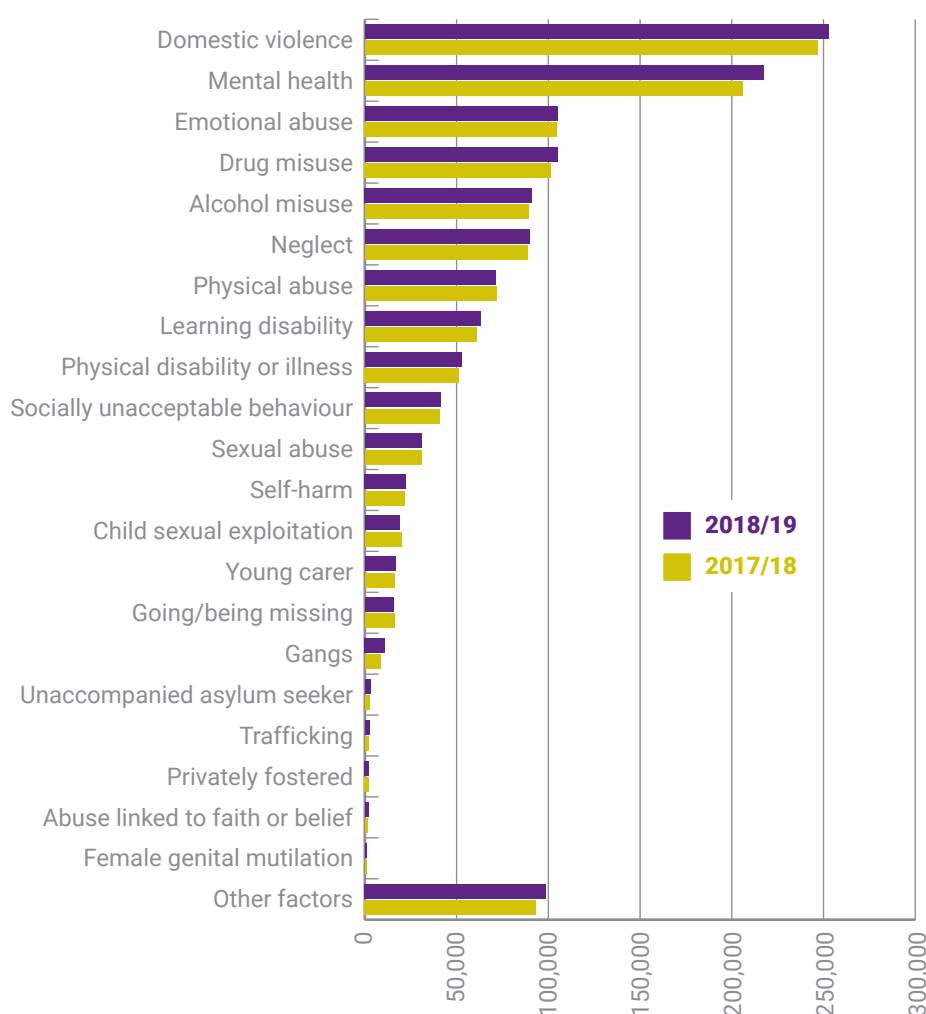
Source: DfE (2019) <https://www.gov.uk/government/statistics/characteristics-of-children-in-need-2018-to-2019>

Further information about English children's ACE-related experiences are provided in figure 2.2, which summarises the additional needs identified at the end of assessment for children who have been registered as in need. These factors included the witnessing of domestic violence (identified in 51% of all assessments), parental and drug abuse (21%) and alcohol misuse (16.4%). These figures also provide information about the specific forms of abuse and neglect many of these children experienced, showing that 21.7% of children had experienced emotional abuse, 18.4% neglect, 14.8% physical abuse and 6.4% sexual abuse.

² These figures are based on estimates provided by the Office for National Statistics, assuming that there are 66.6 million people and that under-18s comprise 21% of the population, providing a figure of 13,776,000 children.

FIGURE 2.2

Categories of additional factors identified at the end of assessment at 31 March 2018 and 2019



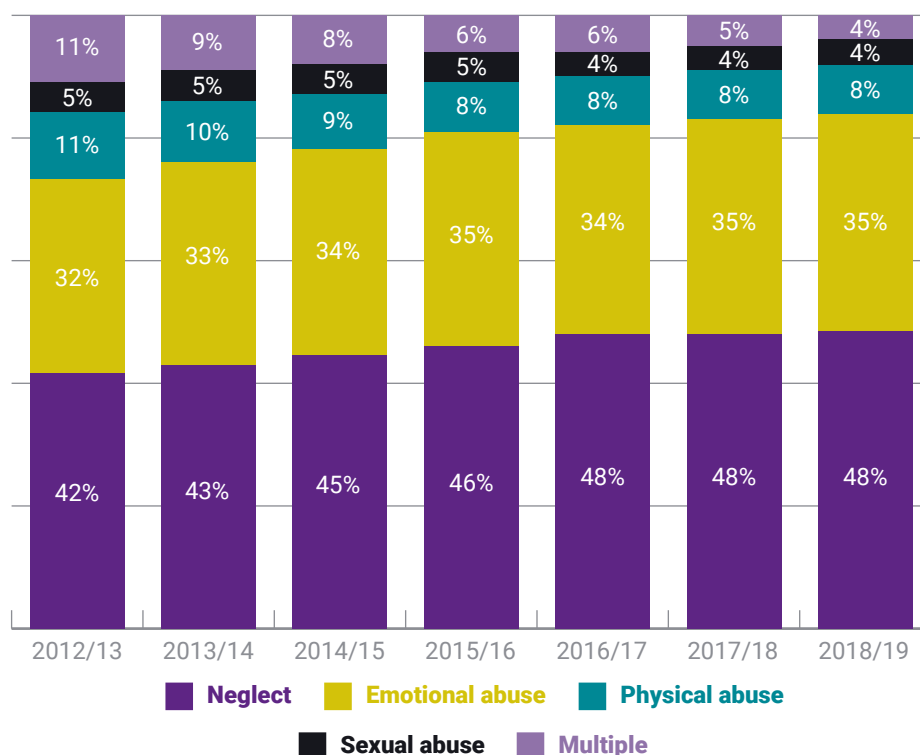
Source: DfE (2019) <https://www.gov.uk/government/statistics/characteristics-of-children-in-need-2018-to-2019>

A child protection inquiry (section 47) is conducted in cases where there is suspicion of significant harm. The number of section 47 enquiries starting in the year has increased annually since 2012/13. The rate per 10,000 children aged under 18 shows a corresponding trend, increasing slightly to 168.3, compared to 166.9 the previous year.

At 31 March 2019 there were 52,300 children subject to a child protection plan, a decrease of 3% compared to 2018 (DfE, 2019). Figure 2.3 provides an overview of the category of abuse identified as the reason for the child protection plan for the last seven years. As it makes clear, neglect is consistently identified as the most common reason for children to receive a child protection plan (ranging from 41 to 48%) followed by emotional abuse and physical abuse. Sexual abuse is identified as primary reason in 4–5% of cases. Reports of children experiencing multiple forms have fluctuated over the past seven years, representing 11.3% of all cases in 2012/13 and 4% of all cases in 2018/19.

FIGURE 2.3

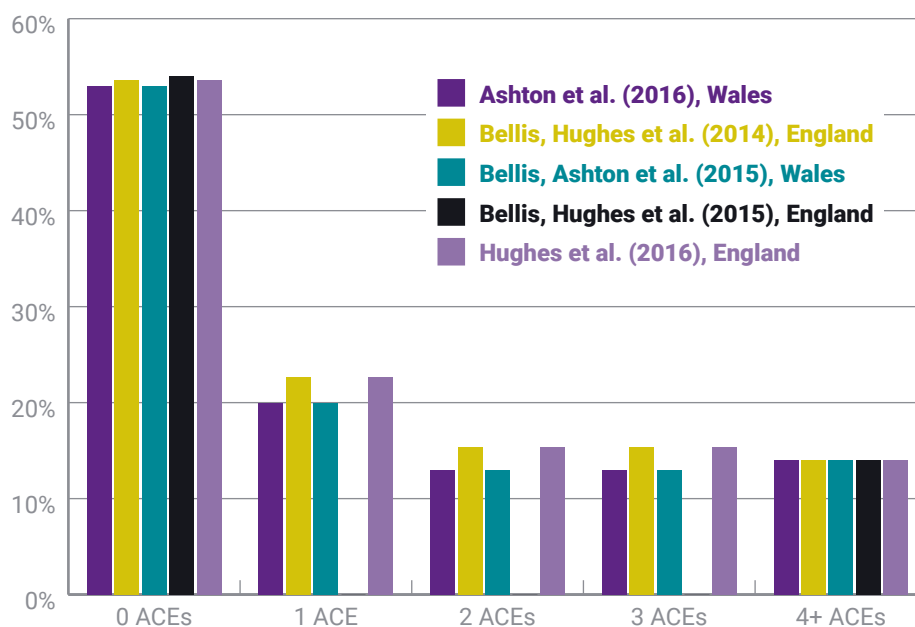
Category of abuse for child protection plans between 2012 and 2019



Source: DfE (2019) <https://www.gov.uk/government/statistics/characteristics-of-children-in-need-2018-to-2019>

FIGURE 2.4

The prevalence of 0 to 4 ACEs in five UK retrospective prevalence studies



Source: Ashton, Bellis, Hardcastle, & Hughes, 2016; Bellis et al., 2015a and 2015b; Bellis, Hughes, Leckenby, Perkins, & Lowey, 2014; Hughes, Lowey, Quigg, & Bellis, 2016

National statistics also make clear that child abuse and other adversities commonly co-occur, as was the case in the original ACE study (Dong et al., 2004; Felitti et al., 1998). More recent studies involving retrospective surveys with adults in England and Wales additionally confirm that the co-occurrence of ACEs is highly common (see figure 2.4).

Studies also show that a significant minority of individuals experience a high number of ACEs throughout the duration of their childhood. Evidence from the child maltreatment literature indicates that this co-occurrence (also referred to as 'polyvictimisation') often occurs in predictable clusters, as described below.

- **Low adversity:** This group of children does not experience any form of abuse or neglect from their caregivers, and the prevalence of other serious family difficulties is relatively low. This is the most prevalent pattern observed across all studies, with estimates ranging between 40% and 60% of the population, depending on the methodology used (Armour, Elklit, & Christoffersen, 2014; Felitti et al, 1998; Murphy et al., 2018; Radford et al., 2011; Wolff, Cuevas, Intravia, Baglivio, & Epps, 2018).
- **Psychological abuse and neglect only:** Studies show that psychological abuse and neglect frequently co-occur alongside other forms of child maltreatment and serious family problems, but also occur independently of other forms of abuse (Felitti et al, 1998; Murphy et al., 2018; Vachon, Krueger, Rogosh, & Cicchetti, 2015). Findings vary dramatically across studies, with some suggesting rates of psychological abuse as high as 60% and others as low as 7%, depending on the definition of abuse and features of the study design.
- **Physical and psychological neglect:** Physical neglect is perhaps the most common form of child maltreatment, occurring in up to 25% of the population, depending on the study's methodology and the characteristics of the population (Ashton et al., 2016; Radford et al., 2011). The frequency of psychological neglect has only recently been investigated, with studies showing that it, too, is highly prevalent, occurring in up to 35% of all children (Vachon, Krueger, Rogosh, & Cicchetti, 2015). These studies additionally show that psychological abuse and neglect commonly co-occur with physical neglect (e.g. Vandermindon, 2019; Vachon et al., 2015). Factors which increase the likelihood of psychological and physical neglect include parental separation and incarceration, as well as parental mental illness and substance misuse.
- **Multiple adversities:** Childhood histories involving more than four adversities are frequently marked by higher levels of family aggression and violence involving psychological abuse, physical abuse and domestic violence. Physical and emotional neglect, as well as parental substance misuse, incarceration and parental separation also commonly occur in these situations, meaning that a small but significant number of children experience six or more ACEs (Radford et al., 2011; Wolff Cuevas, Intravia, Baglivio, & Epps, 2018).
- **Sexual abuse** is the least prevalent ACE but is also the least likely to occur on its own. Studies consistently show that other forms of abuse make children highly vulnerable to sexual abuse occurring both within and outside of the home. Sexual abuse occurring outside of the context of these other risk factors is, in fact, extremely rare (Armour, Elklit, & Christoffersen, 2014; Felitti et al., 1998; Murphy et al., 2018; Radford et al., 2011; Wolff, Cuevas, Intravia, Baglivio, & Epps, 2018).

2.3 The ecology of childhood adversity

While it is clear that ACEs are prevalent and frequently co-occur, it is also clear that child abuse and neglect rarely occur in the absence of other family adversities. Rather, multiple circumstances involving the child, family, community and society work together to increase or decrease the risk (see figure 2.5).

These circumstances – also referred to as ‘risk factors’ – include the five forms of family difficulty investigated in the original ACE studies, as well as other negative circumstances involving the child, family and community.

FIGURE 2.5

Common risk factors associated with child abuse and neglect



Source: EIF, derived from Belsky, 1980; Cichetti & Lynch, 1993; Cichetti & Rizley, 1981; Evans, Li, & Whipple, 2013

The ways in which these risk factors increase the likelihood of each of the 10 ACEs is described in greater detail in appendices A and B. However, it is worth noting that factors most consistently and strongly associated with child abuse and neglect are those involving the child’s caregivers, including the level of stress they are experiencing and their beliefs about their child and child discipline. Factors which increase the opportunity for abuse to occur, such as a child living away from his or her caregiver, also increase the risk of some forms of abuse (for example, Euser, Alink, Tharner, van IJzendoorn, & Bakermans-Kranenburg, 2016).

While low family income and neighbourhood deprivation modestly increase the risk of abuse and neglect, they strongly increase the likelihood of a child experiencing four or more ACEs (Allen & Donkin, 2015; Pelton, 2015; Walsh, McCartney, Smith & Armour, 2019;

Picket & Wilkinson, 2015). For example, a recent ACE study conducted with adults living in England observed that those in the most deprived quintile were three times more likely to report four or more ACEs in comparison to those living in the least deprived quintile (Bellis et al., 2013). As we describe in chapter 4, studies show that low family income not only increases the likelihood of four or more ACEs occurring, but also increases the risk of negative adult outcomes, independently of the 10 original ACE categories.

2.4 Summary and implications for research and practice

In this chapter, we first examined childhood adversity from the perspective of the 10 original ACE categories. These categories encompass five forms of criminally prosecutable child maltreatment and five categories of family difficulty. All 10 are individually associated with an increased risk of family violence, as well as an increase in children's exposure to trauma and the likelihood of trauma-related symptoms. It is essential that we use this knowledge to offer interventions which stop ACEs from occurring in the first place, regardless of their impact on later life outcomes.

We also summarised what is currently known about the prevalence of ACEs and their associated risk factors. Issues regarding the definition of ACEs and the methodological limitations of various study designs (as described in chapter 3) make it difficult to estimate the prevalence of ACEs with any precision. Nevertheless, we do know that ACEs are very common. For instance:

- ACEs are implicated in over 80% of all cases of children identified as being in need, representing approximately 2.5% of the child population
- more than 10% of adults report experiencing four or more ACEs in most retrospective studies
- more than 40% of adults report experiencing at least one ACE during their childhood.

Studies involving child abuse and neglect also show that ACEs occur in predictable patterns. These patterns suggest that psychological abuse is common and can occur on its own, but also frequently occurs alongside other forms of abuse, particularly child physical abuse and the witnessing of psychological and physical abuse between family members. As we outline in chapter 6, this knowledge is particularly useful for designing interventions which aim to stop negative cycles of maltreatment within families.

We also know that a variety of other negative circumstances also increase the likelihood of ACEs. These circumstances include low family income, high levels of parental stress and negative parental beliefs about their child. ACEs are also significantly more prevalent when families are living in deprived circumstances, including poor housing and neighbourhood deprivation. As we describe in chapter 4, these additional adversities not only increase the likelihood of ACEs occurring, they also significantly increase the risk of poor adult outcomes in a way comparable to a history of four or more ACEs.

Finally, despite the frequency of ACEs, it is also clear that many individuals experience no ACEs or very few ACEs during their childhood. This is good news and has important implications for how we plan and offer interventions aimed at preventing and reducing ACEs at the population level. We consider this issue in greater detail in chapter 6.

Summary: What we do and do not know about the prevalence of ACEs and the factors associated with them

What do we currently know about the prevalence of ACEs and related risk factors?

- Five of the original 10 ACE categories represent forms of child abuse and neglect that consistently increase children's exposure to trauma and are criminally prosecutable in most countries.
- Five of the original ACE categories represent serious family difficulties which are highly correlated with each other and are also associated with an increased risk of child maltreatment.
- More than 40% of adults report experiencing at least one ACE during their childhood.
- Between 10 and 20% of the population will experience four or more ACEs during their childhood.
- ACEs often occur in clusters or patterns. Situations involving four or more ACEs are frequently characterised by higher levels of family violence and aggression, which include physical and psychological child maltreatment and domestic abuse.
- ACEs co-occur most frequently when families are living in highly stressful circumstances, which include low family income and high levels of community deprivation.
- A substantial proportion of individuals do not experience any ACEs, or experience very few.

What do we still need to know about the prevalence of ACEs and related risk factors?

- Current prevalence estimates are highly imprecise. This has to do with differences in how ACEs are defined, but also because of limitations in study methodologies.
- ACE studies specifically provide information about the prevalence of the 10 ACE categories and the extent to which they are linked to adult outcomes. They provide little information about the relationship of ACEs to other negative childhood circumstances. This knowledge is essential for designing interventions which aim to prevent ACEs from occurring in the first place.
- While the child maltreatment literature has usefully identified meaningful patterns of ACEs, we do not yet know the prevalence of these patterns within the UK.

What are the implications for research and practice?

- Future research would benefit from improved methodologies for investigating the prevalence of ACEs and co-occurring risks.
- Future research should consider the extent to which ACEs co-occur in predictable and meaningful ways.
- Knowledge of the differing patterns of co-occurrence should be used to design interventions which aim to reduce the risks associated with ACEs and prevent child abuse and neglect and related forms of family dysfunction.

3. Measuring adverse childhood experiences

Overview

Knowing how many children are affected by adverse experiences is essential for designing and targeting effective interventions. However, there is no perfect way of measuring childhood adversity at the population level, as all methods present serious practical and ethical challenges.

In this chapter, we compare the strengths and weaknesses of the various methodologies used to measure ACEs and their related risks. These methods include service records, prospective cohort studies, retrospective cross-sectional surveys and concurrent prevalence surveys. In particular, we consider how various study limitations potentially bias the accuracy of prevalence estimates. We then conclude with recommendations about how various methodological limitations might be overcome so the prevalence of childhood adversities can be better understood.

3.1 Methods for measuring the prevalence of child maltreatment and other childhood adversities

Understanding the frequency of child maltreatment ‘may well be the most difficult task in social science research’ (Finkelhor, 1999; Leventhal, 1998). Measuring child adversity creates many challenges at all levels of inquiry, including the definition of adversity, recruitment issues, case ascertainment, questionnaire design, bias, ethical concerns (including confidentiality and reduction of harm) and comparability with other prevalence studies (Creighton, 2002).

A primary challenge of any investigation of child maltreatment is accurate disclosure. This is because the ACE categories represent circumstances that are often prosecutable by law or are highly stigmatising. Many ACE categories are also relatively rare, meaning that study sample sizes must be sufficiently large to detect forms of maltreatment affecting less than three percent of the population (see figure 3.1; Gilbert et al., 2009). Researchers also encounter difficulties in gaining ethical approval to conduct child maltreatment studies because of data protection issues involving the participants’ right to confidentiality versus mandatory child maltreatment reporting laws (Amaya-Jackson, Socolar, Hunter, Runyan, & Colindres, 2000; Smith, 2016).

Estimates of child maltreatment and other childhood adversities are therefore informed by four separate methodologies: (1) the administrative information available through service records, which provides information about incidence; (2) prospective cohort studies; (3) cross-sectional surveys conducted retrospectively with adults; and (4) prevalence surveys conducted concurrently with representative samples of children and parents. Each of these methodologies contains practical limitations, however, which can substantially bias a study’s findings, as we describe in the following sections.

Box 3.1 Prevalence and incidence: What's the difference?

Prevalence and incidence estimates are frequently confused. **Prevalence** refers to the proportion of the population who have a condition within a particular time period, whereas **incidence** refers to the proportion or rate of individuals who develop a condition within a particular time period.

Prevalence estimates can reflect **lifetime prevalence**, **period prevalence** (within a given time period, such as a year) and **point prevalence**, referring to a specific point in time. High lifetime prevalence of a condition within a population might reflect high incidence or prolonged survival. Conversely, low prevalence might indicate low incidence, a rapidly fatal process or rapid recovery. Prevalence estimates thus include new and pre-existing conditions whereas incidence rates involve new cases only.

Source: Centers for Disease Control (2012)

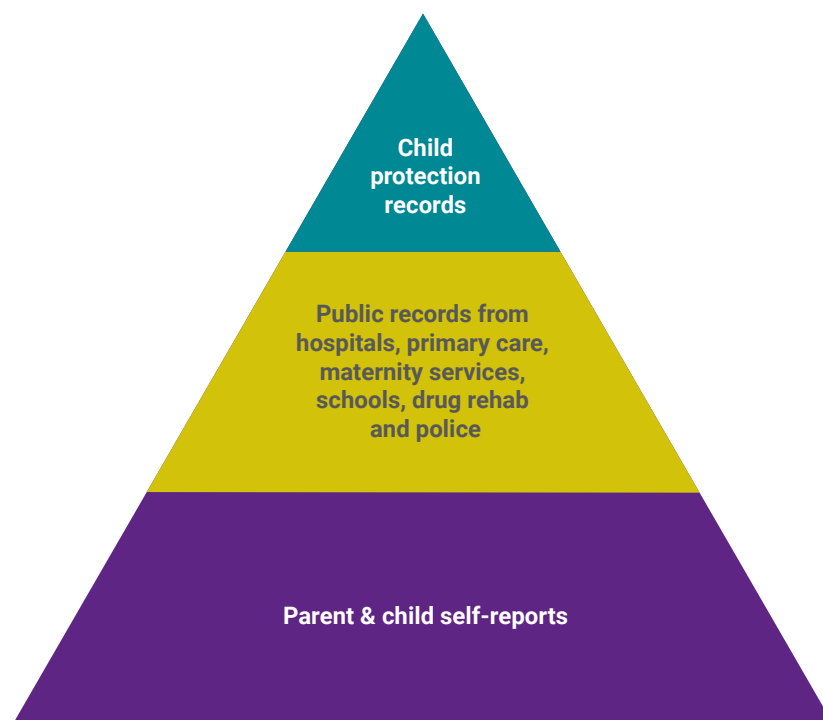
3.2 Service records

Child maltreatment records

Service records encompass the information that is routinely collected by hospitals, mental health services, schools, law enforcement agencies and social services, which forms the basis of most administrative datasets. These records include information about service use (for example, hospital and accident and emergency visits), as well as official reports of child maltreatment. Important sources of child maltreatment data include the statistics reported annually by the Department for Education involving the number of children in need, the number of child protection orders issued, and the number of children taken into care, as summarised in chapter 2.

FIGURE 3.1

Sources of data on child maltreatment



Source: Gilbert et al. (2009)

While service records provide a consistent source of information about the rate at which new cases of child maltreatment are reported (in other words, the *incidence*), they provide relatively little information about *prevalence* of child maltreatment (see box 3.1). This is because service record datasets often overlap in ways that are not fully understood. Studies also consistently show that incidents of child abuse and neglect are grossly under-reported (Gilbert et al., 2009). For example, child protection records in England consistently observe that approximately 3% of all children are known to child protection services within the period of a year. By comparison, population surveys conducted with children, parents and adults indicate that up to 20% of all children may be experiencing some form of abuse and neglect at some point in their lifetime (that is, lifetime prevalence as described in box 3.1).

A number of factors contribute to this discrepancy. First, parents are known to actively conceal maltreatment from the authorities because of fear of stigmatisation or criminal prosecution. Children also do not report abuse because (1) they are not aware that what is happening to them constitutes abuse, (2) they are afraid of further injury or retaliation, (3) they believe that matters will only become worse if they report it, or (4) they do not feel comfortable discussing traumatic experiences (Danese, 2019; Gilbert et al., 2009). Professionals frequently under-report child maltreatment because (1) they fail to recognise it, (2) they believe their case will be difficult to substantiate, or (3) they believe that patient outcomes would not be improved because of a lack of effective treatments or alternative child arrangements (Flaherty et al., 2008; Rebbe, Mienko, Brown, & Rowhani-Rahbar, 2019). Under-reporting is particularly common when it comes to reports of neglect, which are often difficult to substantiate and treat (Brandon & Belderson, 2016).

We also know that the incidence of child maltreatment is highly influenced by child protection thresholds and the availability of social service support. For example, studies consistently show that reports of abuse and neglect are much higher in disadvantaged communities in comparison to middle- or upper-class neighbourhoods (Coulton, Korbin, & Su, 1999). While it is probable that increased incidence may reflect genuine increases in abuse occurring within these areas, these rates also likely reflect a greater social work presence and lower child protection thresholds (Creighton, 2002; Freisthler, Merritt, & LaScala, 2006).

Serious family difficulties

The reporting of serious family difficulties is perhaps even more problematic than that of child abuse and neglect. This is because the information that is routinely collected rarely distinguishes parents from other adults. For example, the National Drug Treatment Monitoring System (NDTMS) provides annual statistics about the adults receiving specialist treatment for drug misuse but does not report whether the recipients are parents and how many children might be affected (Children's Commissioner, 2017). Similarly, the Adult Psychiatric Morbidity survey provides information about adults but does not consider whether or not they have children.

Reliable statistics about parental separation and other forms of family breakdown are also difficult to obtain. While the Office for National Statistics (ONS) reports divorce rates on an annual basis, information about the separation of parents who were not married in the first place is consistently unknown. Similarly, national information on the number of children experiencing separation from a parent due to incarceration is not routinely reported (Kincaid, Roberts, & Kane, 2019). Although information about adult incarceration is collected on an annual basis, information about parents who are imprisoned because of crimes is not consistently collected.

3.3 Prospective longitudinal studies

Prospective studies make use of longitudinal designs which track a large, representative sample, or 'cohort', of individuals over a relatively long period of time. The Millennium Cohort Study (MCS) is a primary example of a prospective, longitudinal study, whereby a cohort of just under 19,000 families were recruited at the time of their child's birth during the years of 2000, 2001 and 2002. Participants were then tracked in 'sweeps' that took place every three years until the children reached adulthood. The sixth sweep was completed in 2018. Each sweep included questions involving family difficulties that include parental mental health problems, substance misuse, the quality of the couple relationship, and parental separation (Hansen et al., 2014). Retrospective questions about childhood abuse and neglect were added to the survey at the time of the fifth sweep (Straatmann, Lai, & Taylor-Robinson, 2018). There are also plans to link the findings to administrative datasets involving hospital and social services records.

The Understanding Society Study (also referred to as the UK Household Longitudinal Study) is a second example of a prospective study which similarly tracks children and adults over a number of years. Launched in 2009, the study is conducted on an annual basis and includes a component dedicated to understanding the experiences of children between the ages of 10 and 15. This component considers children's experiences of adversities such as parental conflict, separation and peer bullying. Findings from this survey are then fed into national datasets, including those maintained by the Office for National Statistics (ONS) and the Children's Commissioner.

A key advantage of prospective cohort study designs is that participants are asked to report on recent experiences, limiting some of the disadvantages inherent in retrospective recall, as we describe below. Prospective cohort designs are also useful for considering how various risk and protective factors predict developmental change, which can inform assumptions about the causal relationship between childhood adversities and later adult outcomes.

However, prospective studies collect information on families in real time. This means that participants are required to provide their informed consent, knowing that disclosures of abuse could be reported. For this reason, many ACEs are likely to be under-reported, especially when it comes to caregiver-perpetrated child maltreatment. There are also practical limitations on the number of questions participants can be asked during any one sweep. Prospective cohort studies typically investigate a wide variety of child and family issues, so questions about childhood adversities must compete with questions about children's cognitive development, their attitudes, and social and emotional wellbeing, for instance. Additionally, participants will not have reached maturity until the study is over, meaning that the lifetime prevalence of childhood adversities cannot be known until many years after the study is complete. This makes it difficult to track changes in point prevalence over time (Meinck et al., 2016).

Nevertheless, prospective studies can provide useful information about the incidence of child maltreatment and developmental change. Some of the practical obstacles of prospective studies can also be overcome through carefully considered protocols designed to address the ethical issues inherent in child maltreatment studies. For example, the US Longitudinal Studies on Child Abuse and Neglect (LONGSCAN) consortium has developed a standardised procedure for collecting information on child maltreatment on a regular basis. This system includes the use of validated measures for asking children and parents questions about child maltreatment and other family problems, well-developed ethical protocols for obtaining informed consent and managing disclosures, and recruitment frameworks for ensuring that samples are representative of the entire population (Knight et al., 2000).

3.4 Retrospective cross-sectional population surveys

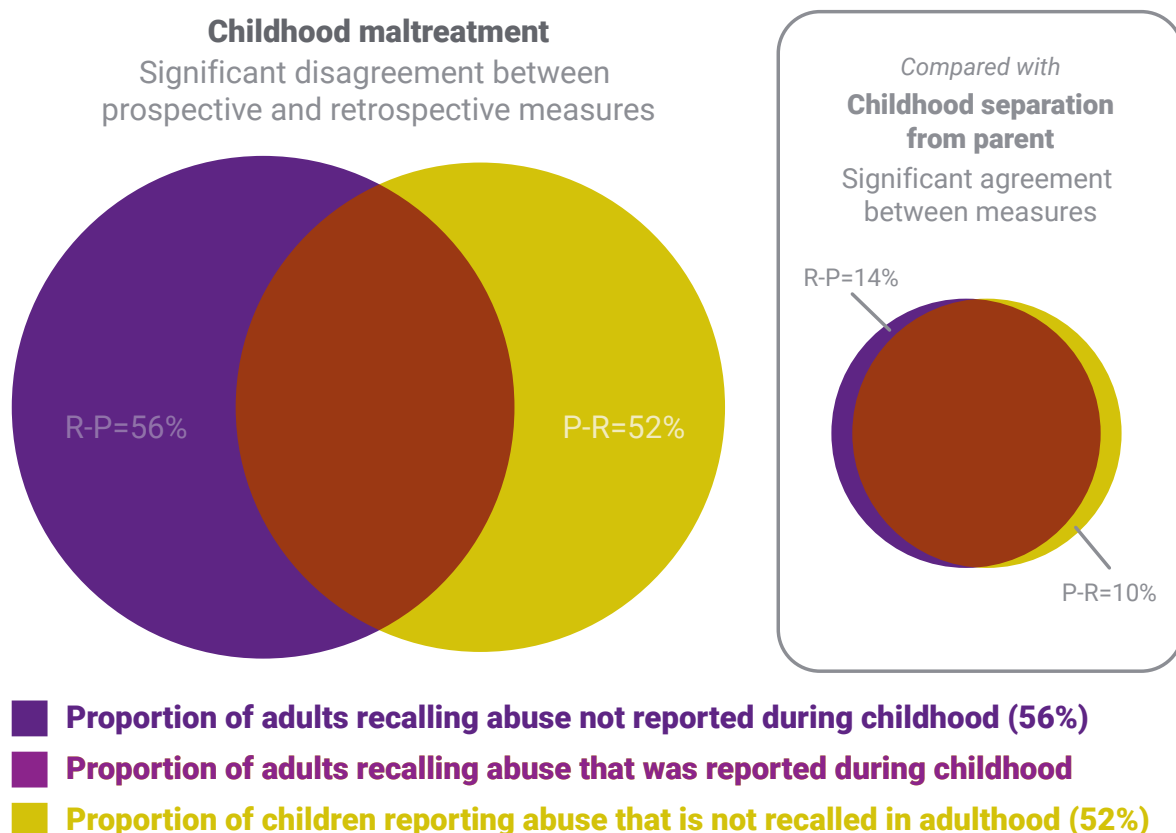
Retrospective studies aim to recruit a representative cross-section of the adult population and ask them to report on experiences of adversity during their childhoods. The majority of ACE studies described in this report, including the original Kaiser Permanente study, are in fact retrospective cross-sectional studies. The British Crime Survey for England and Wales is a second example of a retrospective survey which collects information about adults' history of abuse and neglect on a regular basis.

An advantage of retrospective studies is that some of the ethical concerns regarding the informed consent of children and mandatory reporting are often less pertinent. A second advantage is that retrospective studies investigate the lifetime prevalence of various forms of maltreatment, which provides a useful starting point for researchers to consider the full scope of the problem at a population level.

Despite these advantages, retrospective study designs have a number of shortcomings which limit the reliability of their findings. First, they rely on adult memories of abuse, which are frequently faulty and, in fact, very often no better than chance. For example, a recent meta-analysis of 16 studies involving over 25,000 participants observed that agreement between adult memories and childhood reports was at best, just over 50% – with 52% with childhood reports of maltreatment not being recalled by adults, and 56% of all adults recalling abuse that was not reported during their childhoods (see figure 3.2).

FIGURE 3.2

Overlap between individuals identified through prospective (reporting) and retrospective (recalling) measures of childhood maltreatment



Source: Adapted from Baldwin, Reuben, Newbury, & Danese, 2019

This lack of agreement was even more stark for reports of sexual abuse, physical abuse and emotional abuse, where agreement between prospective and retrospective studies was less than what would be expected by chance.

These findings are surprising and counterintuitive, given that many would assume that experiences of abuse would easily be remembered. However, individuals often do not remember events accurately, even when such events impact their unconscious functioning. Individuals also often have difficulty remembering experiences which occurred when they were very young, or which were not accompanied by negative emotions. Young children are also less likely to recognise some experiences as representing abuse (Hardt & Rutter, 2004). Indeed, the original ACE study authors anticipated that adults would forget experiences of abuse, so assumed that their findings would consistently underestimate the true prevalence of childhood adversities (Edwards, Dube, Felitti, & Anda, 2007).

However, subsequent studies have found that memories are also highly influenced by adults' current circumstances, meaning that those experiencing poor mental or physical health may be more likely to exaggerate memories of childhood abuse (Dalgleish & Werner-Seidler, 2014). For example, a recent Canadian cohort study comparing adult memories to original child protection reports found that adults experiencing higher levels of psychological distress were, in fact, more likely to recall experiences of child maltreatment not verified by earlier reports, in comparison to adults who were not experiencing high levels of distress (Colman et al., 2016). Similarly, studies show that some personality types may be suggestable to false autobiographical memories of abuse (Brewin & Andrews, 2017). For example, higher levels of neuroticism are associated with an increase in memories of serious adverse events which were not recorded during a person's childhood or corroborated by other individuals who were present at the time (Reubin et al., 2016).

Studies also show that the design of retrospective surveys influences the reliability of prevalence estimates. Agreement between prospective childhood reports and adult retrospective reports is observed to be higher when experiences of abuse were explored through face-to-face interviews rather than short-answer, forced-choice questions (Baldwin, Reubin, Newbury, & Denese, 2019). This means that the opportunity for error in many ACE questions is heightened, given that most involve forced-choice, yes/no questions (see table 2.1).

It is also important to recognise that the psychometric properties of most ACE measures have not been tested. Although the internal consistency and test-retest reliability has been evaluated for some ACE measures (Dube, Williamson, Thompson, Felitti, & Anda, 2004), the extent to which participant responses accurately reflect their previous experiences has not been rigorously measured (Hovdestad, Campeau, Potter, & Tonmyr, 2015). We revisit this point in chapter 6, when we consider the sensitivity and specificity of ACE questionnaires for screening child trauma at the individual level.

Studies also show that sampling biases may influence the findings from retrospective studies. For example, a review of retrospective studies of child sexual abuse observed that rates of abuse were inversely related to the recruitment response rate of the survey – in other words, the frequency of abuse was higher in surveys with a low recruitment response rate (30–40%) than it was in surveys with a relatively high recruitment response rate (>60%; Gorey & Leslie, 1997). This suggests that individuals who remember abuse in their childhood may be more likely to participate in maltreatment studies than those not experiencing abuse – resulting in a disproportionate increase in recorded rates of abuse.

A final and important limitation of retrospective adult studies is their cross-sectional nature. While cross-sectional studies can provide crude estimates of the lifetime prevalence of ACEs, their design is not sufficient for understanding how childhood experiences are causally related to adult outcomes (Danese, 2019; Widom, Raphael, & DuMont, 2004). At best, cross-sectional designs provide reliable information about whether childhood adversities co-occur with various adult outcomes. Because the childhood adversity precedes the adult outcome,

a causal relationship is inferred. However, we still know relatively little about the extent to which adversities prospectively predict negative adult outcomes. For this, a prospective study design is required, as we have described. Cross-sectional designs also frequently do not consider the extent to which other issues existing in negative childhood experiences might also explain the association between ACEs and poor adult outcomes. We revisit this issue again in chapter 4, when we consider the strength of the relationship between ACEs and later adult outcomes.

3.5 Concurrent prevalence surveys with children and parents

Concurrent prevalence studies involve surveying a representative cross-section of the child population at regular intervals, rather than following the same individuals over several years, as is the case in longitudinal cohort studies. Cross-sectional surveys have the potential to overcome the reporting biases of retrospective and prospective studies if issues involving confidentiality and abuse disclosure are addressed through rigorous reporting protocols (Laurin, Wallace, Draca, Aterman, & Tonmyr, 2016). They also provide a valid method for comparing changes in the point prevalence of childhood adversity if they make use of the same methodology and are conducted at regular intervals.

The National Survey of Children's Exposure to Violence (NatSCEV) is a primary example of a robust cross-sectional survey, conducted every four years in the US. Each wave involves a nationally representative sample of over 4,000 participants. Half are young people between the ages of 10 and 17, and half are parents with a child aged 0–9 (Finkelhor, Turner, Shattuck, & Hamby, 2015). Participants are initially identified through telephone records and subsequently recruited to participate in an hour-long telephone interview. The live interview process allows researchers to ask probing questions, to ensure that respondents understand the questions and their answers are accurate.

The Juvenile Victimization Questionnaire (JVQ) forms the basis of the NatSCEV telephone interview. The JVQ considers children's experiences of 53 forms of child victimisation which include the 10 original ACE categories, as well as additional categories, such as low family income and community crime. Participants are asked about events which occurred within the last month, year and over their life course, so that information about point, period and lifetime prevalence can be collected.

The JVQ has undergone extensive psychometric testing which has verified its psychometric properties against measures of child trauma and child protection records (Finkelhor, Hamby, Ormrod, & Turner, 2005). Validity studies observe no differences in the response patterns of young people and caregivers, suggesting that parents provide information about child abuse and neglect that is comparable in quality to that provided by children and is more reliable than the information which is typically obtained through service records (Amaya-Jackson, Socolar, Hunter, Runyan, & Colindres, 2000).

Ethical issues involving disclosures are dealt with by ensuring confidentiality at the time of consent. However, individuals who disclose abuse are then contacted by a clinical member of the research team who is trained in telephone crises management. This individual stays in contact with the participant until the situation is resolved or brought to the attention of the appropriate authorities. The names and addresses of all of the participants are retained so that they can be given \$20 as a thank you for their time. This also makes it possible to locate children who have been abused.

Similar methods to the NatSCEV study were used in the most recent UK prevalence survey conducted in 2009 (Radford et al., 2011). This study also made use of the JVQ to interview young people and parents, although the questions were administered through an audio

and computer-assisted self-interview (ACASI) software. A protocol similar to NatSCEV was used for handling disclosures of abuse and neglect flagged through the computer software. The UK study observed that young people did not object to questions regarding child maltreatment and response patterns were similar between caregivers and young people.

Recently, the World Health Organization (WHO) has recommended that all European countries regularly collect information on the point prevalence of child maltreatment and other childhood adversities through surveys designed and implemented in a way similar to the JVQ and UK prevalence survey (Meinck et al., 2016). Specifically, the WHO recommends the following.

- Surveys should be conducted with young people between the ages of 13 and 15 on a regular basis within a period of no less than five years.
- Ideally, surveys with young people should be conducted through schools and be completed with audio and computer-assisted self-interviews (ACASI).
- Recruitment methods should include methods for ensuring that participants are representative of national demographics.
- The interviews should make use of validated population measures, such as the JVQ, the Adverse Childhood Experiences International Questionnaires (ACE-IQ) or the International Society for the Prevention of Child Abuse Screening Tool (ICAST).
- Ideally, such surveys would also include brief validated measures of functional 'outcomes' associated with maltreatment, including the presence of health-harming behaviours, as well as physical and mental health problems.
- Questions should consider maltreatment occurring in the past year and over the life course.
- Survey participation must be completely voluntary, answers must remain confidential and should not be accessible to teachers or other adults, and all data must be anonymised so that answers cannot be traced to individual respondents.
- Ethical procedures should emphasise respondents' confidentiality and anonymity. Information for self-referral to child protection services, however, should be provided to all participants, and referral systems should be in place for those actively seeking help.
- Methods similar to those used in the (NatSCEV) and the UK prevalence survey should be used to recruit and survey parents with children aged 12 and younger to understand the rates of child maltreatment and adversity of preschool and primary school children.

Although the methods advocated by the WHO will not overcome all of the ethical limitations involving consent and disclosure inherent in childhood adversity surveys, it is likely that such efforts will provide much richer and more accurate information regarding the prevalence and incidence of child maltreatment and other negative childhood circumstances. Findings from these surveys will also be useful for understanding the prevalence of other risks associated with child maltreatment so that early intervention services can be effectively planned and targeted.

3.6 Summary and implications for research and practice

In this chapter, we considered four methods commonly used to collect information about the prevalence of child maltreatment and related adversities: (1) administrative information from service records about the incidence of ACEs, (2) prospective longitudinal cohort studies conducted with children and parents, (3) retrospective surveys conducted with adults, and (4) cross-sectional surveys conducted with young people and parents of children at a single point in time.

All of these methods have drawbacks which can either over- or underestimate the prevalence of adverse childhood experiences and their related risks. This implies that the prevalence estimates provided in chapter 2 are, at best, a crude indication of the number of individuals affected by ACEs. Service records and prospective studies have a strong potential to underestimate rates of abuse and neglect, whereas retrospective surveys can potentially overestimate the prevalence of some forms of abuse and neglect. This is especially true when estimating lifetime prevalence of ACEs among those experiencing poor mental or physical health as adults.

The lack of reliable estimates makes it difficult to plan and target services with any precision. Efforts should therefore be made to improve estimation methods. Concurrent studies conducted with children and youth on a regular basis provide a practical way of achieving this, as they overcome many of the biases inherent in retrospective reports. Additionally, these methods can be strengthened if anonymously linked to administrative service records. One specific advantage of record linkage is the potential for long-term follow-up of health outcomes beyond the timescale of the initial survey or trial. However, we should stress that all methodologies must be implemented within the context of rigorous ethical protocols which respect the child's right to confidentiality but include procedures for keeping the child safe when abuse is disclosed.

In 2011, the NSPCC published findings from a concurrent prevalence study with a representative cross-section of parents and children, which has been cited by the WHO as an exemplary way for understanding the prevalence of child abuse and neglect and related adversities at the population level. However, it is now likely that much of this information is out of date. While information about child maltreatment and related adversities is collected routinely through the National Crime Survey and various other panel studies, no UK study has since comprehensively considered the concurrent prevalence of child maltreatment and other serious family difficulties.

The Office for National Statistics is currently considering the feasibility of conducting another comprehensive prevalence survey. Given that robust population-surveillance data is essential for designing and targeting effective interventions, we recommend that methods be introduced to conduct cross-sectional prevalence surveys with children and youth on a regular basis. The guidelines recommended by the WHO provide an achievable way forward, especially since many of them were first pioneered in the UK. We therefore recommend the Office for National Statistics consider how the WHO guidelines be taken forward in a regularly conducted survey.

Summary: The strengths and weaknesses of methodologies used to estimate the prevalence of ACEs and other childhood adversities

What do the current methods used to investigate ACEs tell us about the prevalence of ACEs at the population level?

- Service records are a consistent source of information about child maltreatment which is reported to the authorities. However, there is clear evidence that most child abuse cases are not reported.
- Prospective longitudinal cohort studies provide useful information about the prevalence of child maltreatment and other adversities. Prospective studies also represent the most suitable method for understanding developmental and causal relationships. However, prospective studies are expensive to conduct and are prone to under-reporting biases.
- Retrospective surveys of child abuse and neglect are a useful starting point for considering the lifetime prevalence of childhood adversities, as they potentially overcome some of the under-reporting biases inherent in service records and prospective cohort studies. However, they frequently introduce other biases which can inflate and deflate prevalence estimates.
- Concurrent prevalence surveys, conducted with young people and parents on a regular basis, have the potential to provide the most accurate point prevalence estimates of child maltreatment and related adversities. Examples of well-conducted cross-sectional surveys include the US National Survey of Children's Exposure to Violence and the 2009 UK prevalence study.
- Estimates based on rigorously conducted cross-sectional studies repeated over time could be useful for accurately tracking changes in the point prevalence of child maltreatment and other childhood adversities.

What are the limitations of the current methods used to investigate the prevalence of ACEs?

- Service records consistently underestimate the prevalence of childhood adversities.
- Prospective longitudinal studies also likely underestimate the prevalence of childhood adversities.
- Retrospective, cross-sectional studies have been shown to both over- and underestimate the prevalence of ACEs. They are also not appropriate for making causal judgments about the developmental relationship between childhood adversities and later adult outcomes.
- Concurrent prevalence surveys provide the most accurate estimate of childhood adversities and allow point prevalence comparisons, but they present a number of ethical and practical challenges.
- No method of investigation can provide an exact estimate of ACEs and their related risks.

What are the implications for research and practice?

- There is a strong need for accurate estimates of the prevalence of ACEs and related risk factors at the population level to help with planning and implementing effective interventions.
- Governments should implement rigorous methods to investigate and compare the point prevalence of ACEs in child populations on a regular basis. Ideally, these methods would include surveys involving a sufficiently large and representative sample of children and parents conducted on a regular basis – at least every four years if not more frequently, as recommended by the WHO.
- Estimates derived from retrospective surveys conducted with adults currently provide a limited understanding of the true prevalence of childhood adversity, and therefore should not be used for estimating need or planning services.

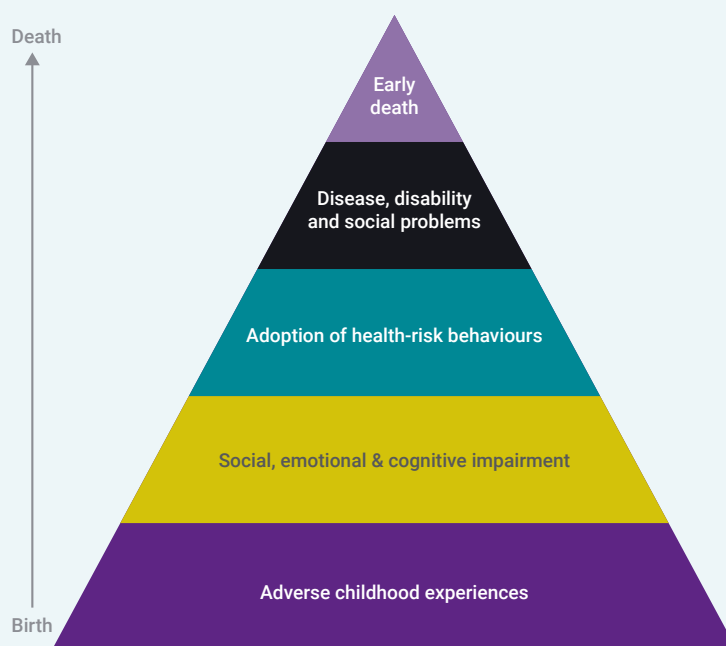
4. What we know about the relationship between ACEs and later adult outcomes

Overview

A key finding observed across the majority of ACE studies is the consistent, graded or 'dose-response' relationship between the number of ACEs experienced in childhood and the increased likelihood of a debilitating disease or mental health problem in adulthood. Although the association between child maltreatment and negative life outcomes was already established well before the concept of ACEs was introduced (for example, Rutter, 1979), the ACE study was the first to make the cumulative effect of multiple ACEs clear. While a single ACE increased the odds of poor adult outcomes by a marginal amount, each additional ACE represented a proportionate increase in risk.

The face-value implication of this graded relationship was that ACEs caused negative adult outcomes, with the authors concluding that 'the impact of these adverse childhood experiences on adult health status is strong and cumulative' (Felitti et al., 1998, p. 251). The authors then went on to introduce the 'ACE pyramid' to provide a conceptual framework for understanding how ACEs triggered a series of events which resulted in negative outcomes in later life (figure 4.1).

FIGURE 4.1: THE ORIGINAL ACE PYRAMID



Source: Felitti et al. (1998)

Specifically, the authors proposed that multiple ACEs led to increases in health-harming behaviours, used by individuals to cope with levels of ACE-related symptoms of trauma. Health-harming behaviours, in turn, increased the likelihood of poor physical health, subsequently leading to early death. Despite cautions about the suitability of cross-sectional studies to determine causality (which the original ACE study authors acknowledged), the intuitive appeal of this model led to the widespread assumption that multiple ACEs were the root cause of many debilitating and life-threatening diseases.

In this chapter, we examine the extent to which this assumption of causality holds true in light of evidence published subsequent to the original ACE study and the methodological concerns introduced in chapter 3. We also consider the predictive value of multiple ACEs in comparison to other negative childhood circumstances which are also associated with poor adult outcomes. We conclude with a discussion about what we currently do and do not know about the causal relationship between ACEs and poor adult outcomes, as well as identify gaps where further research is needed.

4.1 ACEs and adult outcomes: Findings from the original ACE study

The original ACE study observed a graded relationship between the number of ACEs experienced in childhood and negative physical and mental health outcomes in adulthood. However, the strength of this relationship varied depending on the outcome under investigation, as illustrated in table 4.1. For health-harming behaviours, the dose-response relationship was quite strong: while one ACE doubled the risk³ of self-reported problematic drinking, four or more increased it by seven-fold. For intravenous drug use, the relationship was even stronger: one ACE increased the risk of intravenous drug use by 30%, whereas 4+ ACEs increased the risk 10 times over.

However, it is important to stress that this 10-fold increase in risk reflected a rise in **relative** risk, with 3.5% of those with 4+ ACEs engaging in intravenous drug use in comparison to 0.3% of those with no ACEs. However, the **absolute** change in risk was only 3.2% (from 0.3% to 3.5%), reflecting the fact that the vast majority of those with 4+ ACEs (96.5%) did not use drugs intravenously (figure 4.2). This suggests that while 4+ ACEs increases the probability of intravenous drug use, the relationship between ACEs and intravenous drug use is not deterministic.

³ The term risk is used to describe findings involving relative risk calculations, odds ratios and adjusted odds ratios. Methods for adjusting odds vary from study to study (Dicker, Coronado, Koo, & Parrish, 2006).

FIGURE 4.2

The absolute risk of intravenous drug use, comparing experiencing 0 ACEs (left) vs experiencing 4+ ACEs (right)

**TABLE 4.1**

Number of ACE categories and the adjusted odds for the risk of using harmful substances, or having a debilitating physical disease or a mental health problem

Adult outcome	Number of ACEs				
	0	1	2	3	4
Health-harming behaviour					
Considers self an alcoholic	1.0	2.0	4.0	4.9	7.4
Ever used illicit drugs	1.0	1.7	1.9	3.6	4.7
Ever injected drugs	1.0	1.3	3.8	7.1	10.3
Had 50 or more intercourse partners	1.0	1.7	2.3	3.1	3.2
Ever had a sexually transmitted disease	1.0	1.4	1.5	1.9	2.5
Physical health problem					
Ischemic heart disease	1.0	0.9	0.9	1.4	2.2
Any cancer	1.0	1.2	1.2	1.0	1.9
Stroke	1.0	.9	.7	1.3	2.4
Chronic bronchitis or emphysema	1.0	1.6	1.6	2.2	3.9
Diabetes	1.0	1.1	.9	1.2	1.6
Unhealthy lifestyle and mental illness					
Current smoker	1.0	1.1	1.5	2.0	2.2
Severe obesity	1.0	1.1	1.1	1.4	1.6
No leisure time physical activity	1.0	1.2	1.2	1.4	1.3
Two or more weeks of depressed mood in the last year	1.0	1.5	2.4	2.6	4.6
Ever attempted suicide	1.0	1.8	3.0	6.6	12.2
Skeletal fracture, hepatitis or jaundice, and poor self-rated health					
Skeletal fractures	1.0	1.1	1.4	1.2	1.6
Hepatitis or jaundice	1.0	1.1	1.8	1.6	2.4
Poor rated health	1.0	1.2	1.4	1.4	2.2

Source: Felitti et al. (1998).

Note: Odds are adjusted for age, gender, race and educational attainment. Odds ratios and risk ratios (or relative risk) are used to calculate and compare the occurrence of illness, injury or death between two groups. They can also be used to compare the magnitude of risk when the prevalence estimates are less than 20% of the population.

In comparison to mental health problems and health-harming behaviours, the gradient between 4+ ACEs and physical health problems was much weaker. With the exception of chronic obstructive pulmonary diseases (COPDs), having 4+ ACEs no more than doubled the risk of a negative physical health outcome.

This pattern has been upheld in multiple studies since the first ACE study was published. Recent findings from a major systematic review of ACE studies conducted over the past 20 years observed that 4+ ACEs were associated with a:

- weak (less than two-fold) increase in odds of obesity, physical inactivity and diabetes
- moderate (between two and three-fold) increase in odds of smoking, poor self-rated health, cancer, heart disease or respiratory disease
- strong (between three- and six-fold) increase in odds of sexual risk-taking, poor mental health and problematic alcohol use
- very strong (greater than seven-fold in most studies) increase in odds of problematic drug use and interpersonal and self-directed violence (Hughes et al., 2017).

It is important to recognise that even a weak-to-moderate increase in relative odds can have important public health implications, especially when the base prevalence rate is high. For example, some studies show that 4+ ACEs represents a moderate, or two-fold, increase in lifetime risk of cancer. Given that cancer is common, with 50% of the population experiencing it over their lifetime and 363,000 new diagnoses per year, the implication here is that halving the number of young people who experience 4+ ACEs is substantial, potentially reducing the incidence of cancer by 196,500 cases per year. However, the degree to which this assumption is correct remains unclear, because adjusted odds ratios, which are used in most ACE studies to compare outcomes between those with or without 4+ ACEs, become increasingly less valid in predicting relative risk once the prevalence of an outcome is 10% or higher. As a result, while 4+ ACEs represents a significant public health risk to common life-threatening diseases, the precise magnitude of this risk for highly prevalent diseases remains unclear (Chen, Cohen & Chen, 2010).

It is also important to recognise that the strength of these relationships varies across studies, depending upon the questionnaire used, the sample characteristics of the study sample and whether the study employed a prospective or retrospective design. As mentioned in chapter 3, agreement in studies comparing prospective and retrospective responses is low (50% or lower), and the strength of association between ACEs and adult outcomes in prospective studies is typically smaller (Baldwin, Reuben, Newbury, & Danese, 2019). This means that the study biases described in chapter 3 could substantially exaggerate some risks, making it difficult to interpret the magnitude of risk observed in ACE studies. In the sections below, we compare the strength of the relationship between ACEs and a variety of physical and mental health outcomes.

Health-harming behaviours

The ACE study authors originally assumed that the link between ACEs and negative adult outcomes could be explained by increases in health-harming behaviours which were used by teenagers and young adults to cope with higher levels of trauma-induced stress. As mentioned previously, 4+ ACEs represented a substantial increase in the relative risk of health-harming behaviours and this finding has been consistently upheld in studies which make use of a retrospective design (Hughes et al., 2017).

Studies employing a prospective design similarly observe increases in health-harming behaviours, although the strength of association is typically smaller. For example, recent findings involving the Avon Longitudinal Study of Parents and Children (ALSPAC) cohort observed that 4+ ACEs were associated with a three-fold risk of illicit drug use, a two-fold risk in smoking, and a 40% increased risk of problematic alcohol use (Houtepen et al., 2019).

Prospective studies have also confirmed a link between ACEs and risky sexual behaviour, although this risk is small in comparison to studies which make use of a retrospective design. For example, Widom et al. did not observe any association between a history of child maltreatment and risky adolescent sexual behaviour, although there was a three-fold increased risk of prostitution, leading to two-fold risk of HIV (Widom & Kuhns, 1996; Wilson & Widom, 2009).

Mental health

Retrospective ACE studies consistently show that 4+ ACEs represent a three- to five-fold increased risk of mental health problems in adulthood. Prospective studies investigating the relationship between child maltreatment and later life outcomes similarly observe at least a two- to three-fold increased risk of mental health problems occurring already during the teenage years (Meehan, Arseneault, Stahl, Fisher, & Danese, 2020; Scott, Smith, & Ellis, 2010; Straatmann, Lai, & Taylor-Robinson 2018; Varese et al., 2012).

The consistency in these findings has led some to assume that child maltreatment and adult mental health problems are causally linked. Recent findings involving the Environmental Risk (E-Risk) Longitudinal Twin Study cohort support this conclusion, observing that childhood experiences of maltreatment and peer victimisation increased children's vulnerability to mental health problems in late adolescence, after genetic factors and family characteristics were accounted for through the study design and statistical analysis (Schaefer et al., 2018). The study also observed that all forms of child victimisation, including peer victimisation (which is not included in most ACE studies), presented strong and comparable risks to mental health problems occurring in late adolescence. Additionally, the study verified a dose-response relationship between the number of maltreatment categories experienced (in other words, the degree to which children experienced polyvictimisation) and the increased risk of internalising and externalising symptoms. Finally, maltreatment occurring in adolescence (age 12–18) had a stronger association with later psychopathology in comparison to child maltreatment occurring before the age of 12. We return to these findings later in this report.

Physical health

The original ACE study notably observed that 4+ ACEs typically doubled the risk of a number of life-threatening diseases, including stroke, cardiovascular disease and cancer. This finding has been consistently replicated in retrospective studies which make use of the ACE study questionnaire (Appleton, Holdsworth, Ryan, & Tracy, 2017; Hughes et al., 2017).

It is too soon to prospectively investigate the impact of the 10 ACE categories on many life-threatening health conditions, given the ACE questionnaire was introduced only 20 years ago. However, historical cohort studies have found evidence of a dose-response relationship between child maltreatment and various biological risk markers. For example, findings involving the Dunedin Multidiscipline Health and Development Study observed that severe child maltreatment was associated with a 50–60% increased risk of high inflammation levels (a known risk of cardiovascular disease), after other associated risks, such as smoking and family history, were statistically considered (Danese et al., 2009). However, this study also observed that child maltreatment was a relatively poor predictor of metabolic risk markers in comparison to other childhood adversities, such as social isolation and economic disadvantage.

A similar relationship between child maltreatment and medical status was observed among adults (average age 42) who had a documented case of abuse or neglect in their childhoods (Widom, Czaja, Bentley, & Johnson, 2015). Interestingly, this study, which involved a highly socially disadvantaged sample, observed that the strength of this relationship varied, depending on the health outcome and category of abuse. For example, children with a history of neglect had four times the risk of experiencing peak air flow problems (a risk for

lung disease) in adulthood, in comparison to children experiencing other forms of abuse. Maltreated children were also significantly more likely to have above-normal haemoglobin A1C, indicating poor glycemic control and risk for diabetes. However, the authors noted that, on average, the strength of relationship observed between maltreatment history and negative health outcomes was much weaker than is observed in the majority of ACE studies, and that many relationships dissipated to non-significance once other childhood adversities were included in the statistical analysis.

Educational attainment

Although the original ACE study did not consider the impact of childhood adversity on educational outcomes, a series of studies conducted over the past 20 years have consistently observed a modest association between ACEs, school completion and later employment. For example, analyses involving retrospective responses to the US Behavioral Risk Factor Surveillance System observed that 4+ ACEs more than doubled the risks of high-school dropout and unemployment, and increased the risk of living below the poverty line by more than 60% (Metzler, Merrick, Klevens, Ports, & Ford, 2017; Morrow & Villodas, 2018). Retrospective studies conducted in the UK similarly show that 4+ ACEs are associated with a 70% increased risk of leaving school with fewer than five GCSEs (Bellis, Lowey, Leckenby, Hughes, & Harrison, 2013).

Prospective studies also observe a dose–response relationship between ACE history and poor academic attainment, although this relationship typically becomes non-significant when other risk factors, such as low family income and low birth weight, are statistically controlled for (Jaffee et al., 2018; Houtepen et al., 2019). Interestingly, recent findings involving both the E-Risk and Dunedin samples observe that the relationship between child maltreatment history and later cognitive outcomes was largely explained by intellectual deficits existing prior to the abuse occurring and other socioeconomic factors (Danese et al., 2016).

Antisocial behaviour

A strong, prospective relationship between child maltreatment and antisocial behaviour was well established years before the first ACE study was published, and many researchers have since made the case for a substantial, causal link (Fagan & Benedini, 2019). While it is beyond the scope of this review to describe all of the evidence linking child maltreatment to antisocial behaviour, it is worth highlighting several important features of this association.

- First, as mentioned in chapter 2, physical child maltreatment is consistently found to be more predictive of later offending behaviour than other forms of child maltreatment (for example Jaffee, Caspi, Moffitt, & Taylor, 2004).
- Second, antisocial behaviour is better predicted by maltreatment occurring in adolescence in comparison to maltreatment occurring in preschool and primary school (Thornberry, Henry, Ireland, & Smith, 2010).
- Third, the strength of the relationship between child maltreatment and later offending may be influenced by specific genetic risks (Caspi et al., 2002).

More details about the association between child maltreatment and antisocial behaviour are described in appendix A.

4.2 ACEs within the wider context of childhood vulnerability

Studies show that a wide variety of child, family, community and societal factors (figure 4.3, in pink) contribute to child trauma and negative adult outcomes, both in combination with the ACE categories of family dysfunction (in grey) and independently of them.

FIGURE 4.3

Ecological factors which increase the risk of child trauma and poor developmental outcomes



Source: EIF, derived from Belsky, 1980; Cichetti & Lynch, 1993; Cichetti & Rizley, 1981; Evans, Li, & Whipple, 2013

In fact, the strength of association between these additional negative circumstances and negative adult outcomes is often found to be comparable to that 4+ ACEs. For example:

- low birth weight, in particular, is found to consistently double the risk of stroke before the age of 50 (Martinson, & Reichman, 2016)
- a childhood disability increases the risk of problematic drinking in adults by over 80% (Pharr & Bungum, 2012)

- experiences of childhood discrimination on the basis of race, gender, sexual orientation or other characteristics have been found to more than double the risk of adult mental health problems, such as PTSD and suicidal ideation (for example, Paradies et al., 2015).

Further information about how these other adversities contribute to child maltreatment and poor adult outcomes is provided in appendix B.

It is also worth noting that child maltreatment (that is, parent-perpetrated maltreatment) is only one form of child victimisation (see figure 4.4) and is in fact less common in comparison to victimisation involving peers and adults not within the child's immediate family. These forms of victimisation include bullying, various forms of sexual abuse (including harassment and sexting by peers and other adults), being a victim of crime, and witnessing violence outside of the home (Finkelhor & Hamishi, 2001; Gilbert, 2019).

FIGURE 4.4

Child maltreatment within the context of child victimisation



Source: Gilbert, R. (2019).

Studies also show that victimisation from peers and others outside of the family can be just as psychologically harmful as abuse perpetrated by the child's caregivers (Arseneault, 2018; Jackson, Browne, & Joseph, 2016; Wade, Shea, Rubin, & Wood, 2014). Peer victimisation in the form of bullying is particularly found to be associated with later mental health problems, with studies showing that it represents over a 50% increase in risk (Arseneault, 2018; Takizawa, Maughan, & Arseneault, 2014; Takizawa, Danese, Maughan, & Arseneault, 2015; Wade, Shea, Rubin, & Wood, 2014). It is also clear that peer victimisation is far more prevalent than child abuse and neglect, affecting between 800,000 and 2 million children, depending on the study methodology used (see appendix B).

Additionally, studies consistently show that ACEs are strongly associated with economic hardship, causing many to argue that the ACE literature has not sufficiently taken into account the impact child poverty has on child maltreatment, as well as its impact on children's physical and mental wellbeing more generally (Cancian, Slack, & Yang, 2010). Indeed, when economic hardship is added to conventional ACE questionnaires, the predictive power typically increases (Cronholm et al., 2015; Finkelhor, Shattuck, Turner, & Hanby, 2013; Mersky, Janczewski, & Topitze, 2017). For example, recent findings from a survey conducted concurrently with teenagers in the United States observed that family income was more strongly associated with poor physical health in adulthood in comparison to all of the ACE categories, with the exception of having a family member with a mental health problem (Finkelhor, Turner, Shattuck, & Hamby, 2015). Additionally, parental separation, domestic abuse, family substance misuse and parental incarceration

were no longer associated with negative health outcomes when family income and peer victimisation were considered in the statistical analysis. In fact, evidence increasingly shows that the combination of poverty and parental mental health problems may be stronger predictors of poor developmental outcomes in comparison to other combinations of ACEs (Lanier, Maguire-Jack, Lombardi, Frey, & Rose, 2018). Nevertheless, studies show that childhood experiences of abuse and neglect continue to make the strongest contribution to negative mental health outcomes, even after family income and community adversities are considered in the statistical analysis (McLaughlin et al., 2012; Vachon, Krueger, Rogosch, & Cicchetti, 2015).

4.3 Summary of findings and implications for research and practice

The findings reported in this chapter confirm that a strong and consistent dose–response relationship exists between ACEs and health-harming behaviours, mental health problems and antisocial behaviour. This finding is not only consistently confirmed in retrospective studies with adults, but also more robust prospective studies which directly consider the longitudinal relationship between child maltreatment and adult wellbeing. The consistency across studies is such that many have argued that child maltreatment may be a significant, causal contributor to many serious adult psychosocial problems.

By comparison, the relationship between ACEs and adult physical health outcomes is consistently weaker. While retrospective studies observe that 4+ ACEs frequently doubles the risk of various physical diseases, the strength of this relationship is considerably lower in studies employing a prospective longitudinal design (Ehrlich, Miller, & Chen, 2016). The relationship between ACEs and negative health outcomes becomes weaker still when other childhood adversities, such as low birth weight and economic deprivation, are added to statistical models. This is not to say that there is no association between ACEs and physical health outcomes, but it does call into doubt the strong causal relationship implied by the ACEs pyramid. This has significant implications for the effectiveness of strategies which aim to improve physical health outcomes through the reduction of ACEs.

We then considered the impact of a broader set of negative childhood circumstances on child trauma and poor adult outcomes. These circumstances include common forms of child victimisation, such as bullying, which affect up to two-thirds of the child population. They also encompass various forms of social deprivation, including low family income, which chronically restrict children's access to resources which are essential for them to thrive. Studies show that these additional adversities are not only highly correlated with the 10 original ACE categories, but their negative impact on some adult outcomes may be as strong, if not stronger than a history of 4+ ACEs.

These findings underscore the fact that the original ACE categories are not the only adversities associated with negative adult outcomes. They also suggest that an overreliance on the traditional ACE categories could obscure or minimise our understanding of the impact of other negative child circumstances, especially when it comes to physical health outcomes. For these reasons, some have argued that the ACE questionnaire should be expanded to include many of the additional childhood adversities described in this chapter. Indeed, the predictive value of ACE models improves when other adversities such as peer victimisation and low family income are included in ACE questionnaires.

However, we need to carefully consider why adding categories to ACE questionnaires might be needed. If it is to expand our knowledge of how ACEs and other childhood adversities co-vary at the population level, then expanding the number of adversities investigated represents an important step forward. Such knowledge would not only be useful for accurately

estimating the prevalence of negative childhood experiences, it would also provide greater precision in understanding the relative impact of other negative childhood circumstances on adult outcomes in comparison to the 10 original ACE categories. A key recommendation is that future population studies should go beyond the 10 original ACE categories to consider the impact of ACEs in combination with other negative childhood circumstances in predicting adult outcomes, ideally through the use of prospective study designs involving large, representative samples.

We do not, however, recommend that additional categories of adversities be used to predict adult outcomes at the individual level. As we describe in chapter 6, we do not yet know the diagnostic validity of screening practices which count ACEs, or other negative childhood experiences, to understand negative outcomes at the individual level. While the presence of 4+ ACEs is known to increase the relative risk of negative adult outcomes at the population level, the absolute risk for many outcomes remains comparatively small – meaning that the presence of 4+ ACEs is not deterministic. As we describe in the next chapter, individual risk is determined by a wide variety of factors not easily measured, including resilience and genetic inheritance. For these reasons, we believe that an ACE score, whether it includes 10 or 20 categories, is not the best method for predicting the ways in which negative experiences affect the development of an individual child.

Summary: What we do and do not know about the impact of ACEs on adult outcomes

What do we know about the impact of ACEs on adult outcomes?

- Retrospective studies consistently confirm a dose–response relationship between ACEs and an increased risk of negative physical and mental health outcomes in adulthood.
- While poor adult outcomes are more likely when 4+ ACEs are present relative to no ACEs, 4+ ACEs do not inevitably lead to poor adult outcomes.
- The relationship between 4+ ACEs and health-harming behaviours, mental health problems and antisocial behaviour is consistently stronger than the relationship between 4+ ACEs and physical health outcomes.
- Both retrospective and prospective study designs suggest ACEs representing categories of child maltreatment increases the risk of mental health problems by two- to three-fold. The relationship between physical maltreatment and adult criminal behaviour is even stronger.
- A wide variety of other childhood adversities in addition to the 10 original ACE categories also predict poor adult outcomes.
- Peer victimisation is also associated with increases in child trauma and adverse mental health outcomes in adulthood, in a way that is comparable to a history of 4+ ACEs involving categories of parental child abuse and neglect.
- Low family income and parental mental health problems may be stronger predictors of physical health problems in comparison to many of the original ACE categories.

What do we not know about the impact of ACEs on adult outcomes?

- We do not know the extent to which ACEs predict poor outcomes at the individual level.
- We do not know the extent to which different *combinations* of ACEs predict adult outcomes.
- We do not know the extent to which other negative childhood circumstances, in combination with ACEs, or on their own, also predict adult outcomes.
- The extent to which childhood adversities are *causally* related to negative adult outcomes remains unknown.

What are the implications for research and practice?

- The impact of preventive efforts aimed at reducing ACEs is likely to be strongest for mental health outcomes and reductions in antisocial behaviour.
- The extent to which ACE prevention activities can prevent physical health problems remains less clear.
- An overreliance on ACEs for understanding childhood adversity could result in the impact of other negative childhood circumstances being ignored or going untreated.
- Expanding the list of childhood adversities to include additional negative childhood circumstances could be useful in understanding the strength of association between the original ACE categories and those other circumstances, as well as their combined impact on adult outcomes.
- Expanding the list of childhood adversities investigated in prospective studies or surveys conducted concurrently with children and parents has the potential to improve the design and delivery of effective services.
- The value of the original ACE categories or an expanded list of ACE categories for predicting the impact of adversity at the individual level will remain unclear unless it is explicitly tested, as we describe in chapter 6.

5. The mechanisms of ACEs

Overview

The ACE study authors originally assumed that the link between ACEs and negative adult outcomes could be explained by increases in health-harming behaviours which were used by teenagers and young adults to cope with high levels of trauma-induced stress (Felitti et al., 1998). Indeed, the first ACE study provided direct support for this assumption: a history of 4+ ACEs increased the risk of smoking by two, street drug use by four, problematic drinking by seven and intravenous drug use by 10. Subsequent studies also showed that individuals typically started engaging in these behaviours during the teenage years. There was therefore evidence to support the assumption that adverse childhood experiences were connected to poor physical health outcomes through health-harming behaviours.

However, studies conducted subsequently found that health-harming behaviours in fact explained no more than 50% of the relationship between ACEs and poor physical outcomes (Dong, Dube, Felitti, Giles, & Anda, 2003; Dong et al., 2004). Researchers were therefore keen to identify other processes which might also explain the association between ACEs and poor adult physical and mental health. Emerging findings from the biological sciences observed that prolonged exposure to trauma and stress could potentially disrupt important processes involving the immune and nervous systems, eventually increasing an individual's susceptibility to disease and mental health problems (Anda et al., 2006).

In this chapter, we consider how physiological responses to stress might explain the relationship between ACEs and negative adult outcomes. We then consider how various social processes are also associated with ACEs and consequently provide an additional explanatory link. Finally, we consider why some children do well despite experiencing high levels of adversity, through social processes which contribute to their psychological resilience.

5.1 The neurophysiology of adversity

Within the field of child development, childhood adversity has been defined as 'experiences that are likely to require significant adaptation by an average child and that represent a deviation from the expectable environment' (McLaughlin, 2016; McLaughlin, Sheridan, & Lambert, 2014). The term 'expectable environment' refers to childhood circumstances that are sufficient to support normal child development. Examples of adverse environments which require significant adaptation on the part of the child include those that chronically *deprive* the child of physical, emotional and intellectual stimulation or support, or pose an ongoing physical or emotional *threat*.

Child maltreatment is considered by many to represent a severe, if not the most severe deviation from an expectable environment that can support positive child development (Cicchetti & Lynch, 1995). In this respect, child neglect chronically deprives children of the support they

need for positive physical, cognitive and emotional development. Aggressive forms of abuse, on the other hand, constitute a substantial physical and psychological threat. Both of these deviations require significant adaptations on the part of the child which may interfere with optimal physical and psychological development (McCrary Gerin, & Viding, 2017). Over time, this compromised development, or ‘maladaptation’, has the potential to decrease children’s resilience to disease and increase their vulnerability to a variety of mental health problems.

Over the past 20 years, there has been increasing focus on the role of neurophysiological responses to stress to explain the relationship between adverse childhood circumstances and poor physical and mental health. Here we focus on three interrelated neurophysiological explanations which have recent, preliminary support from studies conducted with small samples of children and rodents:

1. processes involving what has been described as **toxic stress**, leading to the dysregulation of cortisol, which subsequently weakens the autoimmune and nervous systems and decreases children’s resilience to disease
2. models of **latent vulnerability**, which explain how adaptations to early threatening or unpredictable home environments increase children’s vulnerability to mental health problems as they grow older
3. potential **epigenetic modulation** to adverse environments through the alteration of the genetic code which governs an organism’s response to stress.

We explain the key features of each of these neurophysiological processes briefly below.

Allostasis and toxic stress

‘Allostasis’ refers to processes used to maintain equilibrium (or homeostasis) within various physiological systems when challenged by various environmental conditions (Danese & McEwen, 2012). Examples of systems requiring equilibrium include body temperature, caloric energy consumption, blood composition and brain chemistry. For example, too much external heat can threaten homeostasis within body temperature, while perspiration acts to counterbalance this heat. Perspiration is therefore an example of an allostatic process which allows the body to maintain homeostasis.

Allostatic systems are adaptive to each other and are efficient for maintaining equilibrium within a variety of systems for short periods of time. However, allostasis starts to exert wear and tear on important physiological systems if it is forced to remain chronically active (Berens, Jensen, & Nelson, 2017; Danese & McEwen, 2012). The extent to which allostasis exerts wear and tear on physiological systems is referred to as ‘allostatic load’.

Immune, cardiovascular, nervous and endocrine systems all support processes which support allostasis (Shonkoff, Boyce, & McEwen, 2009). Within the endocrine system, the hypothalamic–pituitary–adrenal (HPA) axis (figure 5.1) is the central neuroendocrine system coordinating the allostatic responses involving other systems.

The HPA axis response originates in the hypothalamus, a region of the forebrain responsible for metabolic processes and regulation of the autonomic nervous system. The activation of the HPA axis eventually results in release of the hormone cortisol, which, in turn, triggers other physical responses to reinstate the body’s equilibrium.

Stress-related mediators, such as cortisol, play both a positive or negative role in helping humans respond to threatening situations (Shonkoff et al., 2012). Different categories of stress have therefore been proposed as ‘positive’, ‘tolerable’ or ‘toxic’.

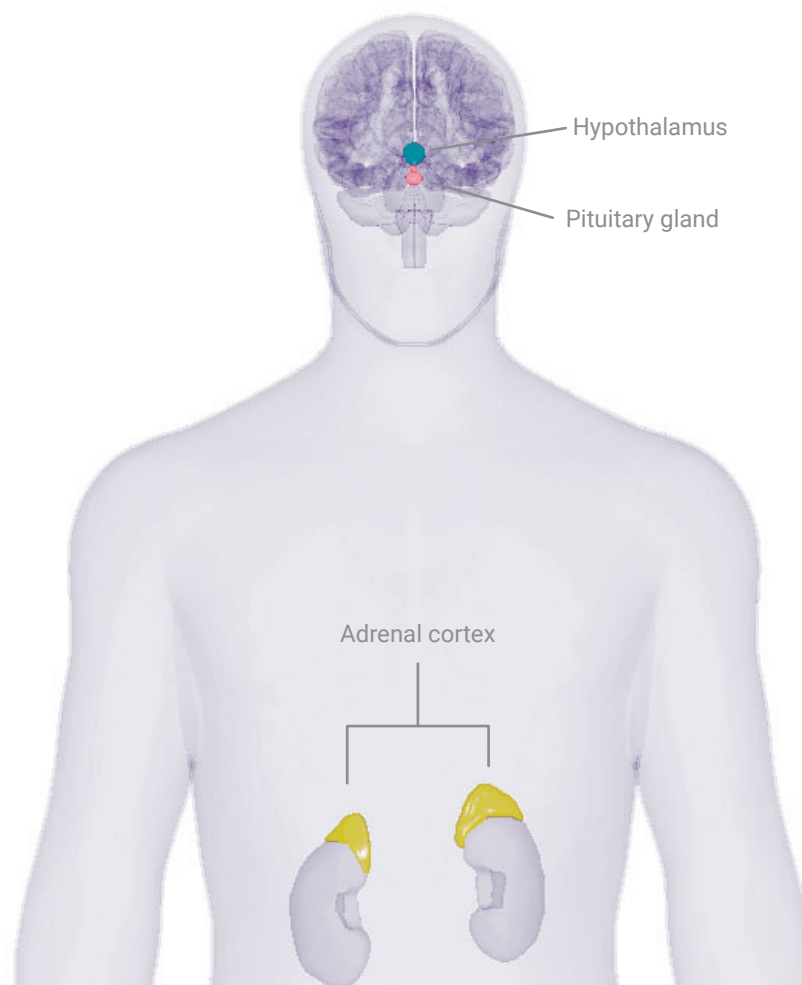
- **Positive stress** is characterised by brief increases in heart rate and small elevations in hormone levels that occur when children are engaged in mildly stressful activities, such as sitting for exams or competing in sports. Children learn to manage positive stress through coping strategies provided by parents, teachers and other adults. While positive stress

might bring about brief moments of panic, it is also thought to enhance performance at school and increase feelings of wellbeing.

- **Tolerable stress** is the time-limited stress humans and animals use to cope with severe but short-term difficulties, such as a natural disasters. While tolerable stress is associated with negative feelings and can exert a physical toll, it also provides humans with the mental and physical endurance to think efficiently in stressful and potentially dangerous situations. Tolerable stress usually dissipates quickly after the threat is no longer present and it is possible to return to normal functioning.
- **Toxic stress** occurs when individuals are exposed to high levels of stress on an ongoing basis, which is typical in circumstances involving abuse and neglect. Toxic stress represents stress which is not immediately resolved, but remains chronic, even when the primary source of the stress is not immediately present.

FIGURE 5.1

Hypothalamic-pituitary-adrenal axis (HPA)



Source: Wiki Commons

Cortisol is particularly useful in helping humans respond to stressful situations where a physical or 'fight or flight' response is necessary. In these situations, the cortisol is spent once the threat has been responded to. Cortisol is also thought to dissipate through processes which help soothe the individual. However, cortisol is continually produced in situations where individuals are exposed to high levels of toxic stress on an ongoing basis. In these circumstances, stress builds up in the blood stream and exerts wear and tear on the nervous and autoimmune systems.

Higher levels of toxic stress occurring as a result of ongoing exposure to traumatic events are particularly thought to impact the autoimmune system by negatively affecting inflammatory responses which support children's resilience to disease. Toxic stress occurring in early childhood is also believed to reduce the production of white matter which supports the development of the executive functions (Lupien, McEwen, Gunnar, & Heim, 2009; National Scientific Council on the Developing Child, 2014). Additionally, the overproduction of cortisol has been linked to reductions in the length of telomeres, which protect the chromosomes containing the human genome. Telomere length is implicated in processes of ageing, with studies showing that it can be negatively impacted by health-harming behaviours (Drury, et al., 2012; Shalev et al., 2013).

Latent vulnerability

The concept of latent vulnerability is useful for understanding how early experiences of maltreatment potentially increase children's susceptibility to mental health problems in adolescence and adulthood. Latent vulnerability models assume that early experiences of abuse and neglect lead to neurocognitive patterns of adaptation that may have short-term benefits for the child, but which increase children's vulnerability to mental health problems as they grow older (McCrory, Gerin, & Viding, 2017; McCrory, Ogle, Gerin, & Viding, 2019). By way of analogy, the neurological impact of early adversity remains 'latent' in much the same way structural deficits in buildings go undetected for long periods of time.

It is important to note that latent vulnerability does not refer to a single neurocognitive system in the brain – but rather is a principle which describes how different brain systems may develop following exposure to abuse and neglect. Recent findings from neuroimaging studies have documented altered functioning in the threat, memory and reward processing systems following maltreatment.

Threat reactivity refers to the ability to rapidly assess potential threats within the environment. The ability to rapidly process threat is likely to be adaptive in situations where children are forced to remain hypervigilant to physical abuse and family violence. A range of studies now show that childhood maltreatment can lead to increased threat reactivity in the form of hypervigilance to threat cues, such as angry faces, which correspond with increased activity in the amygdala and anterior insula, two regions of the brain implicated in threat processes (figure 5.2; Hein & Monk, 2017; McCrory et al., 2011, 2013). These changes are observed even in children with no manifest mental health problems, suggesting that there is an important window for prevention, before any clinical disorder emerges.

Neuroimaging studies involving adolescent victims of abuse and neglect similarly detect increases in amygdala activation during experiments which require the unconscious processing of environmental threats (figure 5.3). Additionally, studies show that the degree of reactivity is proportionately related to the severity of maltreatment, as well as genetic differences (McCrory et al., 2011, 2013). The extent to which this amygdala reactivity is directly associated with specific mental health problems has not, however, been explicitly tested (McCrory & Viding 2015).

Recent neuroimaging studies also provide evidence of maladaptive calibration occurring within the neurocognitive systems responsible for reward processing. For example, altered responses to reward cues have been observed in the striatum, a region of the brain which governs experiences of reward and motivation. Experiences of maltreatment and unpredictable caregiving responses are thought to reduce or attenuate the striatal response to reward, that may in turn be implicated in the development of depression and anxiety, possibly increasing the risk of substance-misusing behaviours (Duffy, McLaughlin, & Green, 2018).

FIGURE 5.2: REGIONS OF THE BRAIN ASSOCIATED WITH THREAT AND REWARD PROCESSING

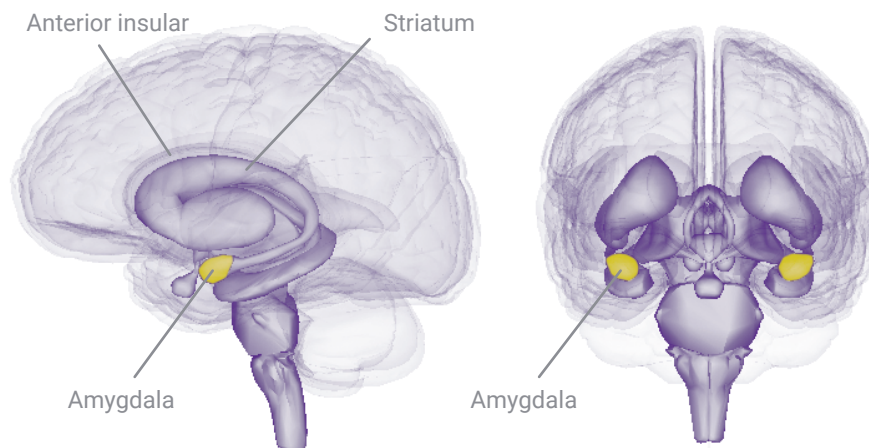
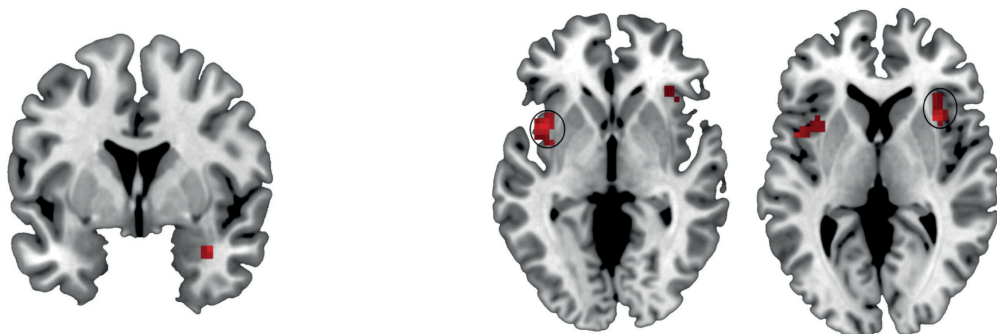


FIGURE 5.3

Amygdala activated in maltreated children exposed to threatening facial expressions



Increased right amygdala reactivity to angry versus calm faces in children exposed to family violence

Increased bilateral anterior insula reactivity in children exposed to family violence

Source: McCrory, E. J., De Brito, S. A., Sebastian, C. L., Mechelli, A., Bird, G., Kelly, P. A., & Viding, E. (2011).

Studies have also observed a pattern of overgeneral autobiographical memory (characterised by a less detailed recollection of personal experiences) and altered brain response during autobiographical memory processing in children who have been maltreated (McCrory et al., 2017; Valentino, Toth, & Cicchetti, 2009). Studies suggest that this altered processing privileges children's negative over positive memories, thereby increasing the risk of depression and other mental health problems.

It is particularly striking that alterations in the threat, reward and autobiographical systems are similar to those observed in adults with diagnosed depression, anxiety and conduct disorder (Gerin, Hanson, Viding, & McCrory, 2019). Latent vulnerability models assume that changes in these neurocognitive systems may confer some benefit for a child trying to manage and cope in a dangerous or unpredictable home environment, but come at a biological cost – similar to that proposed by the toxic stress account – as children grow older. It has furthermore been suggested that altered threat, reward and memory processing may impact children's social-emotional functioning in a way that causes

others to reject or respond negatively towards them, making the generation of new stressful events more likely. This 'stress generation' leads to increased exposure to new stressful events that can add in a cumulative manner to the negative impact of the initial maltreatment experience (Gerin, Hanson, Viding, & McCrory, 2019). Moreover, such events may increase the likelihood that a child loses the support of peers or adults over time, referred to as 'social thinning', which consequently increases children's mental health risk even further by reducing the protective benefit of social support.

Epigenetic modulation

The epigenome regulates when and where genes are expressed (Moffitt, 2013). Epigenetic modulation can therefore be understood as a set of processes which leads to certain genes being 'turned on' or 'turned off'. Genes may or may not exert an influence on the organism depending on the presence of environmental stimuli. Studies with humans and animals exemplify how environmental stress can become 'biologically embedded' by triggering changes in the epigenome which influence the ways in which important genes are ultimately expressed.

Epigenetic change can occur both on the whole genome and on specific genes that store blueprints on how to build neurotransmitters such as serotonin and dopamine (Berens, Jensen, & Nelson, 2017). If genetic information on how to build these neurotransmitters is altered, psychological health and neural function might be distorted, because neurotransmitters play a critical role in regulating and maintaining normal brain functions.

A specific form of epigenetic modifications is DNA methylation. Altered DNA methylation of several genes, including those regulating the HPA axis, correlates with stress reactivity and psychopathology (Mitchell, Schnepf, & Notterman, 2016). Evidence of DNA methylation has been observed in rat pups in response to maternal licking behaviours after the pups have been stressed. In particular, maternal licking behaviours have been found to increase the pups' production of serotonin – a neurotransmitter implicated in feelings of calm and wellbeing. Higher levels of serotonin in turn initiate a sequence of neurobiological events which then permanently alter the genetic code responsible for regulating the pups' stress response (Weaver, et al., 2004; Zhang, Parent, Weaver, & Meaney, 2004). The rat pups' response to stress thereby becomes 'biologically embedded' on the basis of how much licking they received when they were stressed as infants (Berens, Jensen, & Nelson, 2017). Rat studies further show that biological embeddedness can be transmitted across generations if nothing external happens to reverse it, although embedded processes can also be reversed if external circumstances either improve or worsen (Francis, Diorio, Plotsky, & Meaney, 2002).

Studies have observed potential epigenetic changes in the genome of children with a history of child maltreatment, although findings are equivocal (Cecil et al., 2016; Turecki & Meaney, 2016). In fact, the largest study to date, involving the Environmental Risk (E-Risk) Longitudinal Twin Study, observed only minimal changes in the DNA methylation of young people with a history of severe maltreatment, despite there being a clear, prospective association with an increased risk of mental health problems in adolescence (Marzi et al., 2018). The authors highlighted the need to be cautious in making any conclusions about the nature of epigenetic variation in children exposed to adversity based on measurements drawn from blood samples. They conclude that their findings based on humans (as opposed to inferences drawn from animal models) do not support the hypothesis of robust changes in DNA methylation in victimised young people. A particular challenge in this field is that studies involving human children cannot directly sample post-mortem brain tissue as studies with rodents do, relying instead on samples of blood and saliva, which may be inadequate for studying processes occurring in the brain.

5.2 Social processes associated with adversity

The accounts above describe the ways in which early adversity may alter physiological processes in ways that have an enduring impact on children's development. In this section, we consider several social processes that also connect negative childhood experiences to poor adult outcomes. Understanding how these social processes work is useful, as there is strong and consistent evidence showing that they are amenable to early intervention.

Social learning

Studies consistently show that child maltreatment and other dysfunctional parenting behaviours are often shared across generations. Epigenetic modulation provides one potential explanation of how dysfunctional behaviours might be transmitted intergenerationally. Studies show that adverse characteristics, such as substance misuse, behavioural problems and mental health problems, also potentially share a genetic link. Additionally, there is clear evidence that maltreating behaviours are learned through social reinforcement from caregivers and peers. This learning could be characterised as a form of maladaptive calibration to dysfunctional family interactions, although corresponding alterations within the brain have yet to be confirmed. Evidence of this learning is nevertheless widely supported by observational studies.

As described in chapter 2, ACEs often occur in clusters, some of which involve maltreating family interactions involving physical abuse, psychological abuse, domestic abuse, parental incarceration and parental substance misuse. Findings from multiple prospective studies indicate that children raised in these environments are at far greater risk of engaging in aggressive and antisocial behaviour in adolescence and adulthood (Broidy et al., 2003; Widom, 1989; Moffitt, 1993). Findings also show that children potentially learn these behaviours through observation and reinforcement during dysfunctional family interactions (Bandura, 1976; Snyder & Patterson, 1995).

'Coercive' family cycles exemplify how aggressive behaviours are potentially learned and reinforced (Patterson, 1982). Studies show that coercive cycles are frequently established already in the early years, at the point at which children naturally start to behave in noncompliant ways (Tremblay et al., 2004). Parental responses to this behaviour can either discourage or perpetuate aggressive and noncompliant child behaviours. Examples of responses which have been shown to perpetuate aggressive child behaviour include verbally aggressive parental responses (for example, shouting, arguing or degrading the child), harsh physical punishment and physical abuse (Forgatch & DeGarmo, 2002; Snyder, Schrepferman, & St. Peter, 1997). Through these cycles, negative child behaviour is not only reinforced but modelled as an appropriate way to resolve conflict (Gelles & Straus, 1979). Parents thus serve as role models for aggressive conflict resolution, providing children with few opportunities to learn prosocial behaviours or engage positively with others (Keiley, Howe, Dodge, Bates, & Pettit, 2001).

While it is clear that many maltreating behaviours are learned within families, there is also evidence that some children may be more susceptible to this learning than others on the basis of their genetic inheritance. For example, Caspi and colleagues (2002) identified a functional polymorphism in the gene encoding of the neurotransmitter-metabolising enzyme monoamine oxidase A (MAOA) that potentially buffers children from the negative impact of maltreating parenting behaviours.

As we describe in chapter 6, there are a number of interventions with good evidence of preventing or reversing coercive and dysfunctional family interactions. These interventions accomplish this by providing parents with skills for stopping coercive interactions and encouraging positive child behaviours. Parents also learn how to better manage their own stress, anger and reactivity, as well as learn strategies for implementing non-physical or aggressive child discipline.

The extent to which families benefit from these interventions depends upon the parents' capacity to change and the extent to which other mental health and substance misuse problems are present. Studies also show that children may be more or less able to benefit from these interventions on the basis of their genetic inheritance. Improved knowledge of children's genetic susceptibility to negative parenting behaviours, as well as their responsiveness to intervention is necessary for understanding how these interventions might be made more effective (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007).

Polyvictimisation

Polyvictimisation is a term used to describe exposure to multiple forms of victimisation. Children exposed to differing forms of violence, either through abuse or the witnessing of violence, are polyvictims. However, as we observed in chapter 4, violence occurring within the home is not the only form of victimisation many children experience. The term polyvictimisation is therefore also used to describe children who are more vulnerable to abuse in contexts outside of the home.

Studies show that abuse occurring within the home, in fact, increases children's risk of being victimised outside of the home by at least seven-fold (Finkelhor, Ormrod, & Turner, 2007a). Studies also show that polyvictims are at greater risk of developing symptoms of complex trauma in comparison to children experiencing revictimisation within a single category of abuse. Thus, polyvictims are particularly at risk of developing serious mental health problems in adolescence and adulthood (Finkelhor, Ormrod, & Turner, 2007b).

While children do not specifically learn to be polyvictims, studies show that a number of social processes increase some children's vulnerability to it.

- **Living in a dangerous family:** Studies repeatedly show that many of the same social processes which perpetuate victimisation within the home are carried forward by children into contexts outside of the home. These behaviours include coercive interactions between maltreated children and school peers. In these situations, children who perpetrate violence are also at greater risk of becoming victims of violence themselves (Schwartz, Dodge, Pettit, & Bates, 1997). The emergence of these risk behaviours are consistent with the neurophysiological mechanisms described in the previous sections.
- **Emotional problems and social isolation:** It is clear that experiences of victimisation increase the risk of trauma-related mental health problems, making it difficult for children to form positive relationships with others and increasing the risk they will become socially isolated (Maughn & Cicchetti, 2002; Perry, Hodges, & Egan, 2001). Studies also show that socially isolated children are easier targets for children who bully (Bernstein & Watson, 1997). Again, these emotional and social vulnerabilities may reflect changes in a range of neurocognitive systems.
- **Dangerous communities:** Dangerous communities not only increase children's exposure to crime and violence, but also contain features which create opportunities for victimisation to occur. These features include poor social ties, lack of a police presence, and locations which allow antisocial individuals to congregate (Coulton, Crampton, Irwin, Spilsbury, & Korbin, 2007; Lauritsen & Quinet, 1995).
- **Dangerous schools:** Schools often contain features which facilitate bullying and other forms of peer victimisation. These features include practices which permit bullying, a low tolerance for diversity, limited opportunities for school success and engagement, low teacher connectedness, and increased opportunities for gang infiltration (Voisin & Elsaesser, 2013). Studies also show that the risk of victimisation increases at transition points during children's education, including entry to primary and secondary school (Finkelhor, Shuttuck, Turner, & Hamby, 2011).

- **Chaotic family circumstances:** Irrespective of aggressive and violent family interactions, chaotic family circumstances are consistently found to increase opportunities for polyvictimisation. For example, a lack of adequate supervision is consistently shown to increase children's vulnerability to victimisation, as are situations where the child is exposed to a greater number of transient adults (Turner, Vanderminden, Finkelhor, & Hamby, 2019). Situations which limit parents' ability to provide emotional support for their child, including the presence of a high number of life stressors, have also been found to increase children's vulnerability to polyvictimisation.

Many of the school-based interventions described in chapter 6 include components which specifically address the social and contextual mechanisms that are thought to increase children's vulnerability to polyvictimisation. These components include practices which discourage children from behaving coercively towards each other, teach children important prosocial skills, promote friendships, decrease social isolation among vulnerable children, increase school engagement, discourage bullying, and maintain vigilance against gang infiltration. Studies also show that some of these issues can be addressed through community-based interventions that include strategies for keeping children and families safe and increasing social cohesion (Kotch et al., 2014).

Resilience

Although studies consistently show that child abuse and neglect are strongly associated with poor adult outcomes, they also observe that a significant proportion of maltreated children develop into adulthood relatively unscathed. These children have been described as 'resilient', as they have developed positively 'despite exposure to significant threat, severe adversity, or trauma that typically constitute major assaults on the processes underlying biological and psychological development' (Cicchetti & Garmezy, 1993). In other words, they have avoided maladaptation in the face of extreme and dysfunctional environments.

Researchers observe that evidence of resilience points to the existence of self-righting tendencies in human development which work to protect children who must cope with extreme adversities (Hanson & Gottesman, 2012; Masten, 2001; Sameroff, 1983). These self-righting tendencies include some of the genetic factors described in the previous sections, as well as a variety of social processes that support the development of coping skills that children can use to counteract the negative impact of childhood adversities (Masten & Cicchetti, 2016).

As we have described above, rat dams' soothing behaviours, in the form of licking, help to protect their pups' development by releasing hormones which increase their resilience to stress. Similarly, in humans, sensitive parenting behaviours and a positive attachment relationship are thought to soothe children and promote resilience as they develop (Shonkoff et al., 2015). However, these behaviours are frequently absent when children are severely neglected or abused, with studies showing that maltreated children are at an increased risk of having a disorganised attachment relationship with their caregivers (Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010). Thus, when children have been severely maltreated by their parents, resilience must often be promoted in contexts outside of the family environment.

A variety of protective factors existing at the level of the child, family and community have been found to increase resilience, although the specific processes which promote resilience have yet to be explicitly identified (Cicchetti, 2013). For example, maltreated children who appear to be resilient often exhibit greater self-confidence and ego-flexibility (Cicchetti, Rogosch, Lynch, & Holt, 1993; Cicchetti & Rogosch, 1997), although the processes which contribute to these skills within the context of maladaptive relationships remain unclear. Similarly, there is evidence showing that trusting relationships with peers and other adults in childhood and adulthood may also contribute to resilience (Bellis et al., 2017; Bellis, Hughes, Leckenby, Perkins, & Lowey, 2014; Collishaw et al., 2007; Luthar & Eisenberg, 2017).

However, given that much of the evidence regarding resilience comes from cross-sectional studies, it is difficult to ascertain whether friendships with peers and trustworthy adults actually increase children's resilience, or whether resilient child characteristics make these relationships possible (Cicchetti, 2013). Researchers nevertheless speculate that processes associated with a secure attachment, which foster a sense of trust, efficacy and hope within the child, all work to reinforce resilient functioning within the context of a trusting relationship (Masten & Cicchetti, 2016).

Evidence from the prospective LONGSCAN study has also identified community-level factors which promote social cohesion and social control as promoting resilience in children who were neglected before the age of 12 (Kotch et al., 2014). However, the specific community processes through which this occurs are once again not fully understood.

In sum, there is evidence that some children are more resilient to the impact of child maltreatment than others, and that warm and trusting relationships potentially promote resilient development. However, it is important to recognise that supportive relationships and other promotive factors do not represent a magic bullet, especially in cases where children have experienced high levels of abuse and neglect. For example, studies have confirmed a dose-response relationship between polyvictimisation and resilience, showing that increases in victimisation types are associated with decreases in resilience (Luthar, 2006). Studies also show that severe maltreatment occurring early in life significantly decreases the likelihood of resilience as children develop. Some have used this as evidence to suggest that there is a sensitive period within which resilience is best promoted, although it is important to stress that findings in this area are non-conclusive (Cicchetti, 2013; Herrenkohl, Herrenkohl, & Egolf, 1994). Additionally, it is worth noting that resilient characteristics may not be as prevalent as some studies have suggested, as prevalence estimates vary, depending on how resiliency is defined and methods used to investigate it (Walsh, Dawson, & Mattingly, 2010).

In chapter 6, we consider the characteristics of interventions that aim to promote children's resilience. At their core, all of these interventions include features which help practitioners create a trusting environment for children in which resilient coping skills can be learned. Approaches thought to promote resiliency include various forms of cognitive behavioural therapy, which help children reframe negative past events and instil a sense of hope. Resilience-building interventions also contain features which increase children's self-esteem, through the creation of 'mastery experiences', which increase children's sense of self-efficacy. Therapeutic interventions targeting highly traumatised children also offer strategies to help them manage their fears and other negative emotions.

5.3 Summary of findings and implications for research and practice

In the first half of this chapter we considered several interrelated neurophysiological processes associated with stress which potentially explain how exposure to abuse and neglect in childhood may impact children's development: (1) stress-related increases in cortisol, which exert wear and tear on the nervous and autoimmune systems, weakening children's resilience to disease over time; (2) the recalibration of different brain systems following exposure to abuse and neglect, which may increase children's vulnerability to later mental health problems; and (3) changes in epigenetic modulation associated with low-nurturing childhood environments.

Research in these areas reminds us that exposure to early adversity can have a biological impact. One particularly important finding is that clinically relevant biological markers associated with abuse have been observed in the absence of mental health disorders – creating a strong case for preventative interventions (McCrory, Gerin, & Viding, 2017). A

deeper understanding of the biological markers associated with an increased risk of later mental and physical health problems will no doubt have important implications for increasing the effectiveness of interventions.

However, the conclusions that can currently be drawn from these studies are at best preliminary. This is because the majority of studies to date have been restricted to animals or small samples, meaning we do not yet know the extent to which their findings are generalisable to humans. Findings involving epigenetic processes occurring in animals may, in particular, not be generalisable.

In sum, the implications of recent neurophysiological evidence for interventions which aim to reduce trauma and promote children's resilience remain tentative at best, meaning that we are some way from this research being able to guide decisions about how and when we should intervene (Slopen, McLaughlin, & Shonkoff, 2014). Further observational and experimental research involving larger samples of humans is therefore necessary.

In the second half of this chapter, we identified several social processes that are associated with childhood adversity and which provide a logical point for intervention. These processes include coercive family cycles, which perpetuate aggression and abuse within the home; peer victimisation and bullying, which increase the risk of vulnerable children becoming polyvictimised outside of the home; and positive adult behaviours, which can increase children's resilience to the negative impact of childhood adversities. We believe that interventions that target these processes represent a useful opportunity for stopping ACEs and reducing their negative consequences.

Finally, we feel it is important to remember that health-harming behaviours consistently link ACEs to poor adult outcomes. In this chapter, we considered how health-harming behaviours might be explained by neurophysiological processes contributing to children's perceptions of reward. There is also clear evidence that health-harming behaviours are learned and reinforced through vulnerable children's interactions with their parents and peers. In the following chapter, we will consider how health-harming behaviours can be prevented through school and family interventions.

Summary: What we do and do not know about the causal processes linking ACEs to negative life outcomes

What do we know about biological and social processes associated with ACEs?

- Increases in cortisol associated with high levels of trauma and stress are thought to exert wear and tear on the autoimmune and nervous systems in a way that decreases resilience to disease and mental health problems over time.
- Preliminary evidence from neuroimaging studies supports hypotheses linking adversity early in life to an increased risk of mental health problems in adolescence and adulthood.
- Neuroimaging findings have documented changes in brain structure and function in children who have experienced abuse and neglect, even when they *do not* present with mental health disorders, pointing to an underlying or latent vulnerability.
- Studies involving carefully controlled experiments with rats provide preliminary evidence of epigenetic modulation, which may impact their response to stress. However, evidence from human studies remains equivocal.

- Aggressive and maltreating behaviours are reinforced through coercive and dysfunctional family interactions. There is consistent evidence linking these cycles to increases in antisocial behaviour and further child victimisation.
- A history of child maltreatment increases children's vulnerability to poly-victimisation occurring in multiple contexts within and outside of the family home.
- Observational evidence suggests that some children are more resilient to stress than others.

What do we not know about the biological and social mechanisms underpinning ACEs?

- We do not yet know the full extent to which neurophysiological processes observed in animals also take place in humans.
- We do not yet know the extent to which studies involving small samples of humans generalise to larger populations.
- The extent to which early vulnerabilities in brain function contribute to specific mental health problems has not been explicitly observed.
- More research is needed to understand the neurophysiological impact of negative childhood circumstances other than child maltreatment on children's physical and mental development.
- We still do not have a precise understanding of the causal physiological mechanisms linking poor adult outcomes to childhood exposure to adversity.
- Evidence from the biological sciences is often not specific enough to inform the content of child and family interventions.

What are the implications for research and practice?

- Further research is required to better understand the ways in which childhood adversity and negative adult outcomes are causally linked through neurophysiological processes.
- Recent neurophysiological findings nevertheless support the need for preventative interventions targeting the social processes observed to link adverse child circumstances to poor adult outcomes.
- Knowledge about the social processes which perpetuate adversity or increase resilience remains an important starting point for designing and delivering effective interventions.

6. What we know about the effectiveness of interventions for preventing ACEs and reducing symptoms associated with child trauma

Overview

When the ACE study was first published, the authors concluded that comprehensive strategies, involving a combined offer of universal, selected and targeted interventions, were necessary to prevent and reduce ACEs. These strategies included intensive home visiting interventions for vulnerable families, school-based programmes aimed at preventing children and young people from engaging in health-harming behaviours, and targeted psychotherapeutic treatments designed to help individuals cope with ACE-related trauma symptoms.

In the 20 years since, a wide variety of public health strategies have been developed to reduce or prevent ACEs. However, to our knowledge, none of these efforts make a continuum of *evidence-based* interventions available as part of a population-wide approach aimed at preventing or reducing ACEs. More typically, responses have been restricted to a relatively narrow range of services, or involve a single activity, such as routine ACE screening or trauma-informed care.

In this chapter, we consider first what we know about the potential of routine ACE screening and trauma-informed care for preventing and reducing ACEs. We then consider how a continuum of universal and targeted interventions with causal evidence of preventing ACEs or reducing ACE-related trauma symptoms might be offered – either in conjunction with or independently of these other efforts – to prevent or reduce ACEs at the population level. We conclude with some thoughts for how these recommendations could be put into practice.

6.1 Routine ACE screening

Routine ACE screening, also referred to as routine enquiry, involves using items from the original ACE questionnaire to ask children and adults about their history of ACEs. This practice was informed by findings subsequent of the first ACE study, which observed a 35% reduction in outpatient visits and 11% reduction in accident and emergency visits after the ACE questions were added to the routine Kaiser Permanente health survey. Anecdotal evidence suggested that while the scores were useful for raising patients' awareness of ACEs, the questionnaire also provided a therapeutic opportunity for patients to discuss their previous adverse

experiences with their health care providers (Felitti, 2004; 2019). This finding is corroborated by studies suggesting that experimental disclosure (for example, asking study participants to write about traumatic experiences as part of an experiment) potentially provides a therapeutic benefit (Frattaroli, 2006). Health services in the US, Canada and UK have therefore started to implement routine ACE screening within various frontline services.

In appendix C, we summarise the evaluation evidence of eight studies of routine ACE screening conducted in North America and the UK. Collectively, the findings of these studies suggest that routine ACE screening is feasible and generally acceptable (for example, Conn et al, 2018), although some studies have found that it is also time-consuming and requires high levels of practitioner training. One study also provided preliminary evidence suggesting that ACE screening could lead to positive change outcomes if offered in combination with an effective treatment. However, it is also clear that some practitioners and families are uncomfortable with the ACE questions, including families who are the most vulnerable (Mersky, Lee, & Gilbert, 2019). This begs the question as to whether some ACE questions could cause unintended harm or create additional stigma, especially in populations who are already marginalised.

More fundamentally, the extent to which ACE screening practices actually improve child outcomes has not yet been rigorously tested (Ford et al., 2019). Presumably, improved outcomes for children is the primary reason ACE screening is used, but to date, no studies have rigorously tested whether:

- routine ACE screening processes actually provide an empowering or therapeutic function , as the anecdotal findings from the Kaiser Permanente study originally suggested
- ACE practices are beneficial from a child protection standpoint, leading to an end of child maltreatment or removing children from harmful circumstances
- routine ACE screening is an effective or an efficient means of referring children on to further, evidence-based treatment.

With respect to the third point, concerns have been raised about the extent to which it is ethical to screen adversities in the absence of clear referral protocols leading to evidence-based treatments. In this respect, the Bayview Child Health Center-Center for Youth Wellness in California (BCHC-CYW) model described in appendix C is exemplary, as it is offered in combination with several treatments that have robust evidence of reducing trauma in children who have been exposed to high levels of violence, including several models which are discussed at later points in this chapter. However, the extent to which the practice accurately *identifies* children in need of treatment remains unknown, as the diagnostic properties of the BCHC-CYW screening tool, or other ACE screening tools, have not been fully tested.

For these reasons, several prominent child welfare organisations, including the US Child Trends Research Center and the Canadian Task Force on Preventive Health Care, have recently identified a set of concerns which need be addressed before the ACE screening is widely implemented (Barnes et al., 2019; Finkelhor, 2018; McLellan et al., 2019; Murphy & Bartlett, 2019). Here, we highlight the 10 most common concerns.

1. The diagnostic sensitivity and specificity of ACE screening tools has not yet been established (Barnes et al., 2019; Danese, 2019; Murphy & Bartlett, 2019). We therefore do not know whether the 10 original ACE categories are sufficient for understanding childhood trauma and adversity. As we have described in previous chapters, the 10 original ACE questions do not cover important negative circumstances that are associated with high levels of trauma, while also covering categories which may be less significant for some children (such as parental separation). In this way, an over-reliance on ACE screening tools or other similar cumulative risk models may fail to identify some children who require support, while at the same time falsely identifying another group of children as being vulnerable (Finkelhor, Shattuck, Turner, & Hamby, 2013; Kelly-Irving, & Delpierre, 2019).

2. The psychometric properties of most ACE screening tools have not yet been fully tested (Barnes et al., 2019). Although the original instrument underwent some internal validity testing for use as a population surveillance tool, its test-retest reliability with differing populations has not yet been established (Mersky, Janczewski, & Topitzes, 2017; Oh et al., 2018). This means that some families might not fully understand the questions or answer them in a consistent and reliable way.
3. The predictive validity of many ACE measures has also not yet been compared to other validated measures of child trauma symptoms or service records. Additionally, we do not know how predictive the tool is against various biomarkers of children's health (Barnes et al., 2019).
4. While studies show that exposure to traumatic events is associated with symptoms of trauma and other mental health problems (Lewis et al., 2019), we still know relatively little about the extent to which cut-off scores predict symptomology, nor do we understand the appropriateness of cut-off scores for differing age groups (Bethell et al., 2017; Oh et al., 2018).
5. We do not know if ACE screening is the most efficient way of understanding adversity in comparison to other methods of enquiry. For example, many frontline workers already ask children and parents about the stresses they are facing in the course of typical care. We have yet to understand how ACE screening can add value over current assessment practices.
6. The appropriate use of ACE screening practices for identifying children where there are potential child protection concerns is not yet fully understood. Guidelines and standards for implementing ACE screening questions have yet to be developed and fully tested. This means that many of the ACE screening practices in current use may not be compliant with the WHO's standards for screening implementation (Barnes et al., 2018; Wilson & Jungner, 1968).
7. The frequency of routine ACE screening has not yet been verified – that is, whether it should occur at every GP visit, for example, or at regular intervals throughout a child's life.
8. Screening for adversity alone in the absence of other protective factors may provide practitioners with an overly simplistic or one-sided view of a child's development (White, Edwards, Gillies, & Wastell, 2019). Exposure to adversity represents only one aspect of a child's experience, and does not provide information about their overall wellbeing, personal strengths or other important protective factors.
9. Several ethical concerns associated with ACE screening remain unaddressed. In particular, questions have been raised about the appropriateness of screening practices in the absence of evidence-based treatments (McLellan et al., 2019). We also do not yet know if some of the ACE questions could cause inadvertent harm, especially if asked by individuals who have not been specifically trained to ask sensitive questions (Barnes et al., 2019; Murphy & Bartlett, 2019). Moreover, the risk of harm associated with allocating families to services on the basis of an unvalidated instrument remains unknown (Barnes et al., 2019). The extent to which families experience discomfort with ACE and trauma screening also requires further investigation (Legerski, & Bunnell, 2010; Tonmyr, Draca, Crain, & MacMillan, 2011).
10. A singular focus on a child or family's cumulative adversities has the potential to increase marginal families' experiences of stigmatisation (Lacey & Minnis, 2019). An inadvertent consequence, then, is that families might avoid treatment because of fear of stigmatisation or discrimination (Murphy & Bartlett, 2019). Additionally, individuals could come to define or stigmatise themselves on the basis of their ACE score (White, Edwards, Gillies, & Wastell, 2019).

It is therefore clear that ACE screening could provide some benefits, but serious questions remain. In particular, the accuracy of the tool must be established and explicit guidelines for its use in practice, including safeguarding practice, must be tested and agreed. Additionally, for ACE screening to be useful, it should be embedded within practices which lead to evidence-based care – not only on ethical grounds, but also for practical reasons. In this respect, it is worth remembering that ACE screening comes with a cost, so there should be clear reasons for justifying any additional expense. We therefore strongly recommend that services carefully consider whether the potential benefits of ACE screening outweigh the additional time and expense it takes to implement.

6.2 Trauma-informed care

Definitions of trauma-informed care

Trauma-informed care (TIC) is a second example of a universal approach aimed at reducing the stress associated with ACE-related trauma and increasing children’s resilience (Sweeney, Clement, Filson, & Kennedy, 2016). Trauma-informed approaches originated in healthcare organisations, but are now increasingly being adopted by schools, child welfare agencies, criminal justice systems and other frontline services for children and families.

A trauma-informed approach is underpinned by the principle that experiences of trauma are prevalent and may interfere with service users’ ability to form a trusting relationship with their providers (Elliott, Bjelajac, Falot, Markoff, & Reed, 2005). A primary aim of TIC is to increase service providers’ awareness of how trauma can negatively impact children and adults, so that they can avoid practices that might inadvertently cause further trauma. TIC also aims to increase the sensitivity of service providers so that users perceive them as trustworthy and feel safe to disclose abusive experiences. Additionally, practices which empower clients and give them greater choice are viewed to be particularly valuable for vulnerable clients, as they aim to minimise power disparities which vulnerable clients might view as threatening (Sweeney et al., 2019). An overview of the original TIC principles is provided in table 6.1 and SAMSHA’s (2014) most recent guidelines for a trauma-informed approach (the 3 E’s and 4 R’s) are provided in table 6.2.

TABLE 6.1

Principles underpinning trauma-informed approaches

1.	Seeing through a trauma-informed lens, meaning that there is an understanding and acknowledgment of the links between trauma and mental health.
2.	Adopting a broad definition of trauma extending beyond PTSD, including recognising social trauma and the intersectionality of multiple traumas.
3.	Making trauma enquiries sensitively and with knowledge about how to respond.
4.	Referring people to evidence-based, trauma-specific support, where indicated.
5.	Addressing vicarious trauma and retraumatisation.
6.	Prioritising trustworthiness and transparency in communications, such as limiting the professionals a person is required to repeat their traumatic history to.
7.	Moving towards collaborative relationships and away from helper–helped roles, based on trust, collaboration, respect and hope.
8.	Adopting strengths-based approaches that reframe symptoms as coping adaptations, such as dissociation as an adaptive strategy to escape unbearable experiences.
9.	Prioritising emotional and physical safety for service users and providers.
10.	Working in partnership with trauma survivors, for example to design, deliver and evaluate services.

Source: Sweeney & Taggart (2018)

TABLE 6.2

The three E's and the four R's of trauma

The three E's of trauma

Events: Circumstances and events may include the actual or extreme threat of physical or psychological harm (for example, natural disasters or violence) or severe, life-threatening neglect that imperils healthy development. These events and circumstances may occur as a single event or repeatedly over time. This element of SAMHSA's concept of trauma is represented in the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which requires all conditions classified as 'trauma and stressor-related disorders' to include exposure to a traumatic or stressful event as a diagnostic criterion.

Experience: An individual's experience of these events or circumstances helps to determine whether it is a traumatic event. A particular event may be experienced as traumatic for one individual and not for another. How the individual labels, assigns meaning to, and is disrupted physically and psychologically by an event will contribute to whether or not it is experienced as traumatic.

Effects: The long-lasting adverse effects of the event are a critical component of trauma. These adverse effects may occur immediately or may have a delayed onset. In some situations, the individual may not recognise the connection between the traumatic events and the effects.

The four R's of a trauma-informed approach

Realisation: In a trauma-informed approach, all people at all levels of the organisation or system have a basic realisation about trauma and understand how trauma can affect families, groups, organisations and communities as well as individuals. People's experience and behaviour are understood in the context of coping strategies designed to survive adversity and overwhelming circumstances, whether these occurred in the past, are currently manifesting, or are related to the emotional distress that results in hearing about the first-hand experiences of another.

Recognition: People in the organisation or system are able to recognise the signs of trauma. These signs may be gender, age or setting-specific and may be manifested by individuals seeking or providing services in these settings. Trauma screening and assessment assist in the recognition of trauma, as do workforce development, employee assistance and supervision practices.

Resist the retraumatisation: A trauma-informed approach seeks to resist the retraumatisation of clients as well as staff. Organisations often inadvertently create stressful or toxic environments that interfere with the recovery of clients, the wellbeing of staff and the fulfilment of the organisational mission. Staff who work within a trauma-informed environment are taught to recognise how organisational practices may trigger painful memories and retraumatise clients with trauma histories.

Source: SAMSHA, 2014

A wide range of activities are offered under the umbrella of TIC (Hanson & Lang, 2016). These activities include practitioner training about the impact of ACEs on human development; advice on how practitioners can form a more trusting relationship with individuals (for example, by asking clients questions such as 'what happened to you' as opposed to 'what's wrong with you'); screening practices which assess trauma symptoms (as opposed to traumatic experiences, as assessed by ACE tools); and redesigning services in a way that aims to engender clients' with a sense of safety and increased choice. Table 6.3 provides an overview of the range of activities offered as part of TIC.

Evaluations of trauma informed care

Although trauma-informed practices are now widely implemented in schools, GP practices and other frontline services, relatively few have been rigorously evaluated. Several recently completed systematic reviews report that most evaluations primarily investigate service outcomes. Those that do consider child and family outcomes frequently lack a comparison group, meaning that their findings are at best, preliminary (Bailey et al., 2019; Berger, 2019; Bunting et al., 2019; Thomas, Crosby, & Vanderhaar, 2019). For this reason, several recent Cochrane reviews have 'come up empty', meaning that they could not identify studies rigorous enough to inform the findings of the review (Maynard, Farina, Dell, & Kelley, 2019).

By and large, findings from less rigorous studies are positive, observing improvements in practitioners' knowledge of ACEs, screening and referral procedures, potential reductions in cases of child maltreatment (although it has been difficult to disambiguate these from reporting practices), increased placement stability, and reductions in reports of depression, family difficulties and child behaviour problems.

TABLE 6.3

Primary aims of trauma-informed care

Workforce development	Trauma-focused services	Organisational change
Training of all staff on the impact of abuse or trauma	Screening/assessment to identify trauma history and symptoms	Collaboration, coordination and information sharing (internal and external)
Measuring staff knowledge/practice	Child's trauma history included in case record/plan	Procedures to reduce risk for client retraumatisation
Strategies/procedures to address/reduce traumatic stress among staff	Availability of evidence-based trauma-focused practices	Promotion of consumer engagement
Knowledge/skills in accessing evidence-based services		Provision of strengths-based services
		Safe physical environment
		Written policies that include/support TIC principles

Source: Hanson & Lange, 2016

Findings from the first rigorously conducted randomised trial of TIC are less positive, however. This study considered whether a comprehensive TIC strategy delivered through the US state of New Hampshire's child welfare services resulted in improvements in trauma screening practices, case planning, mental health and family involvement, progress monitoring, collaboration, and perceptions of the state's overall system performance. The study found relatively little difference in practice outcomes within any of the measured domains. While the evaluators were not certain whether this lack of change was due to the complexity of the model, or ongoing budget constraints, they nevertheless felt that TIC might have provided more value if there was greater clarity about how specific service components lead to measurable change in children and families (Jankowski, Schifferdecker, Butcher, Foster-Johnson, & Barnett, 2019).

The potential for trauma-informed care to prevent ACEs or reduce ACE-related trauma has therefore yet to be fully understood (Hanson & Lang, 2016). While it is reasonable to assume that increased client choice and trust represent improvements in services, the extent to which these improvements will also reduce symptoms of trauma, anxiety and other forms of stress, or lead to sustained improvements in outcomes, has not yet been rigorously tested (Champine, Lang, Nelson, Hanson, & Tebes, 2019). Additionally, practitioners have observed that while TIC training frequently includes information about the trauma-informed principles and the relationship between ACEs and children's wellbeing, it does not always provide practitioners with specific skills for putting this knowledge into practice (Alessi & Kahn, 2019). Some have also observed that many TIC activities have a large overlap with practices that are already in place in many services, so the extent to which TIC represents a measurable improvement over current practice is frequently not specified or measured (Atwool, 2019; Sweeney, Filson, Kennedy, Collinson, & Gillard, 2018).

Models of trauma-informed care should therefore clearly specify how each practice component will contribute to reduced symptoms of trauma within a well-articulated theory of change. This specification should include greater clarity about how each component is expected to improve preidentified short- and long-term outcomes, as well as consider

the extent to which the broader evidence base supports these assumptions. TIC activities should also specify how they add value over current practice. More rigorous evaluations of the impact of TIC on child outcomes are also required before TIC can be considered a proportionate and evidence-based response to childhood trauma and adversity.

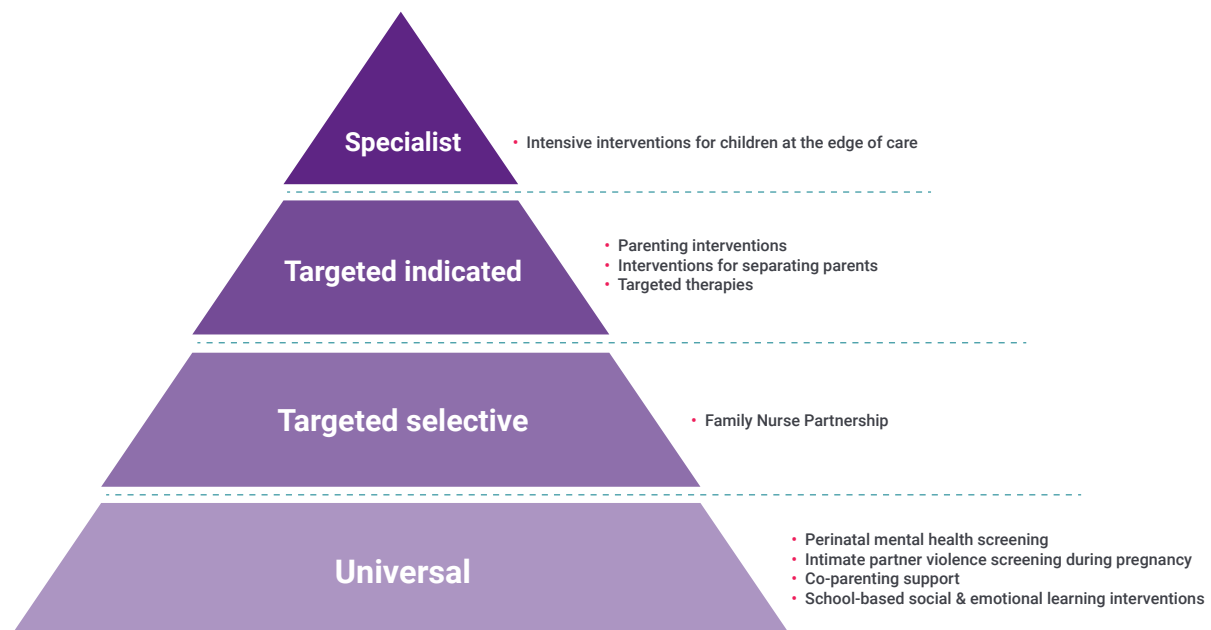
6.3 A comprehensive public health approach involving evidence-based child and family interventions

As mentioned, the first ACE study concluded with recommendations for adopting a comprehensive public health strategy offering evidence-based interventions at the universal, selected and targeted levels. We conclude this chapter by doing the same.

In table 6.4, we provide the details of 33 interventions with robust evidence from high-quality randomised control trials (RCTs) of (1) preventing at least one of the 10 original ACE categories, (2) reducing the health-harming behaviours associated with ACEs, or (3) specifically reducing negative symptoms associated ACE-related trauma. These activities encompass 10 separate intervention models aimed at stopping or reducing ACEs or the social mechanisms which contribute to them. Each of these interventions has a theory of change which specifies how each of its components targets a specific social process associated with ACEs. All of these interventions also have evidence from at least one robustly conducted RCT meeting EIF's level 3 criteria for attributing causality to the intervention.⁴

FIGURE 6.1

Interventions at the universal, targeted and specialist levels



Universal interventions

Universal interventions are activities made available through or alongside universal services, such as health visiting, schools and GP services. Although the impacts for universal interventions tend to be small to moderate (with effect sizes ranging from 0.20 to 0.40) they are also relatively inexpensive.

⁴ For information on the EIF evidence standards, see: <https://guidebook.eif.org.uk/eif-evidence-standards>

Screening and referral systems are not required to implement these interventions, as they are designed to be made available to everyone. Nevertheless, they need to be delivered to a high standard if they are to achieve their maximum effectiveness. They also need to be well integrated into a wider system of care, so that more vulnerable children and families can receive additional support if necessary.

The following are examples of **universal activities** with causal evidence of reducing ACEs and ACE-related risks.

- **Perinatal mental health screening:** Studies show that maternal mental health screening with instruments that have proven diagnostic validity, like the Edinburgh Postnatal Depression Scale, are an effective way of offering treatments, such as CBT and psychodynamic therapy, that have proven evidence of reducing symptoms of trauma, anxiety and depression during the perinatal period (Gavin, Meltzer-Brody, Glover, & Gaynes, 2015).
- **Perinatal intimate partner violence (IPV) screening and advice:** Studies show that IPV screening and advice integrated into routine antenatal care can increase mothers' awareness of abusive intimate partner behaviours and reduce their risk of further victimisation, when leading to effective advice and treatment.
- **Social-emotional learning (SEL) interventions:** SEL interventions are school-based curriculums that provide children with strategies for increasing emotional resilience. Although there is no direct evidence that SEL interventions reduce ACE-related trauma, SEL interventions have consistent causal evidence of improving children's emotional wellbeing, reducing their risk of health-harming behaviours, increasing self-efficacy, and reducing peer victimisation within schools (Durlak et al., 2011). Examples of SEL interventions with causal evidence of increasing children's resilience and reducing health harming behaviours include Advanced LifeSkills Training, Friends for Life, the Good Behaviour Game, Lion's Quest Skills for Adolescent Behaviours, PATHs, the Olweus Bullying Program and Positive Action.⁵
- **Co-parenting support:** Co-parenting support provides couples with strategies for increasing family harmony by helping them work together as a co-parenting team. Studies show that couples are particularly receptive to co-parenting advice when it is offered at key transitions in their children's development. Family Foundations has causal evidence of reducing couple conflict and improving children's behaviour when offered to couples expecting their first child. Schoolchildren and Their Families and Strengthening Families Programme 10 to 14 have similarly been found to improve children's behaviour and increase family harmony when offered to families on a preventive basis when children enter primary and secondary school respectively.⁶

Targeted selective interventions

Targeted selective interventions are those offered on a preventative basis to children and families who are identified at being at particular risk of ACEs, but may not be experiencing any specific ACEs or symptoms of trauma. To date, the Family Nurse Partnership (FNP) programme⁷ is the only intervention identified by EIF with causal evidence of preventing

⁵ The following SEL interventions can be found in the EIF Guidebook:

- Advanced LifeSkills Training <https://guidebook.eif.org.uk/programme/advanced-lifeskills-training>
- Friends for Life <https://guidebook.eif.org.uk/programme/friends-for-life-health-led>
- Good Behaviour Game <https://guidebook.eif.org.uk/programme/the-good-behaviour-game>
- Lion's Quest Skills for Adolescent Behaviours <https://guidebook.eif.org.uk/programme/lions-quest-skills-for-adolescents>
- PATHs <https://guidebook.eif.org.uk/programme/paths-elementary-curriculum>
- Positive Action <https://guidebook.eif.org.uk/programme/positive-action>

⁶ The following co-parenting support programmes can be found in the EIF Guidebook:

- Family Foundations <https://guidebook.eif.org.uk/programme/family-foundations>
- Schoolchildren and Their Families <https://guidebook.eif.org.uk/programme/schoolchildren-and-their-families>
- Strengthening Families 10 to 14 <https://guidebook.eif.org.uk/programme/strengthening-families-programme-10-14>

⁷ See in the EIF Guidebook: <https://guidebook.eif.org.uk/programme/family-nurse-partnership>

ACEs from occurring in at-risk populations. FNP's evidence is frequently used within the ACEs literature as a primary example of the potential of early intervention for preventing and reducing ACEs.

FNP was developed as a preventative intervention for first-time teenage mothers and their children who are particularly vulnerable to ACEs. FNP has good evidence in the US and the Netherlands of reducing the risk of child maltreatment and domestic abuse, although these findings have not been replicated in the UK.

Targeted indicated interventions

Targeted indicated interventions are those which aim to reduce ACE-related trauma symptoms, increase children's resilience and prevent the intergenerational transmission of ACEs. When implemented to a high standard, the impact of these interventions is moderate to large (effect sizes range from 0.7 to 1.00). Successful implementation includes the use of robust systems for referring families into the interventions, to ensure that they are eligible and receive the highest-quality care. It is noteworthy that several of these interventions are used within the BCHC-CYW Integrated Paediatric Care Model mentioned at the beginning of this chapter and described further in appendix C.

The following list includes interventions that have causal evidence of improving the outcomes of children and families with a history of ACEs at the **indicated** level.

- **Interventions for parents at risk of maltreating their child:** A primary aim of these interventions is to replace maltreating parenting behaviours with age-appropriate strategies for positive parent–child interactions. Examples of high-impact parenting interventions with causal evidence of reducing the risk of physical and emotional maltreatment include those offered as part of the Incredible Years and Triple P series.⁸
- **Intensive psychotherapeutic support for parents and parents and children who are at risk of child maltreatment because of ACE-related trauma symptoms because of a history of child maltreatment:** A primary aim of intensive psychotherapeutic treatments is to help vulnerable parents work through traumatic past experiences as a way of helping them develop more positive relationships with their children. Examples of psychotherapeutic interventions with causal evidence of reducing maltreatment risk and child and parent trauma include the Lieberman model of Child-Parent Psychotherapy and the Child First programme.⁹
- **Individual therapies offered to children who have been neglected or abused:** Trauma-focused Cognitive Behavioural Therapy is an example of an individualised therapeutic intervention with causal evidence of reducing symptoms of ACE-related trauma and increasing children's resilience.¹⁰
- **Interventions for separating or divorcing couples:** Acrimonious parental separation is a highly prevalent ACE. Triple P Family Transitions and New Beginnings both have causal evidence of improving children's behaviour and reducing parental conflict and anger when offered to separating couples.¹¹
- **Intensive interventions to prevent children going into care:** The trauma associated with ACEs frequently increases the likelihood of highly aggressive child behaviours that can lead to out-of-home care. Intensive interventions are therefore often necessary to reduce aggressive child behaviours and improve family functioning. Interventions with causal

⁸ See in the EIF Guidebook: <https://guidebook.eif.org.uk/programme/incredible-years-preschool>

⁹ See in the EIF Guidebook:
• Child-Parent Psychotherapy <https://guidebook.eif.org.uk/programme/child-parent-psychotherapy>
• Child First <https://guidebook.eif.org.uk/programme/child-first>

¹⁰ See in the EIF Guidebook: <https://guidebook.eif.org.uk/programme/trauma-focused-cognitive-behavioural-therapy>

¹¹ See in the EIF Guidebook: <https://guidebook.eif.org.uk/programme/triple-p-family-transitions>

evidence of reducing the need for out-of-home care include Multisystemic Therapy (MST), Functional Family Therapy (FFT), Multidimensional Family Therapy, Treatment Foster Care Oregon Adolescent (TFCO-A) and Treatment Foster Care Oregon Prevention (TFCO-P). Multisystemic Therapy for Child Abuse and Neglect (MST-CAN) additionally has evidence of reducing child maltreatment risk when offered to parents who have maltreated their child.¹²

6.4 Common features of effective interventions

Although the 33 interventions listed in table 6.4 represent a diverse range of models, they are similar to TIC in recognising that trust between practitioners and families is a core intervention component. This is because trust is essential for intervention participants to feel safe and motivated to share their experiences and work through the difficult emotions associated with ACEs (National Scientific Council on the Developing Child, 2015). Trust-building is not only a central feature of all of the therapeutic interventions listed in table 6.4, but also many of the universal activities which aim to build trust between peer groups and children and teachers (Oberle, Domitrovich, Meyers, & Weissberg, 2016).

However, it is important to recognise that establishing trust can be challenging when individuals have learned to mistrust others through the experience of multiple ACEs. As a result, high levels of practitioner skill and time are necessary for practitioners to gain the trust of intervention participants and to help them stay motivated to work through difficult issues (Kazdin & McWhinney, 2018). Practitioner skill is, in part, determined by practitioners' previous experience and qualifications, but also by the support they receive from their managers and organisation (Kornhaber, Walsh, Duff, & Walker, 2016). Organisational factors also determine the time available to practitioners to work with those with a history of ACEs, although practitioner time is also determined by broader, system-wide issues, involving workforce capacity and interagency referral processes (Hall, Porter, Longhi, Becker-Green, & Dreyfus, 2012).

6.5 Summary and implications for research and practice

In this chapter, we have considered the strength of evidence underpinning two practices commonly used to prevent or reduce ACE-related trauma: routine ACE screening and trauma-informed care. To date, neither practice has been rigorously evaluated, so their potential for preventing ACEs or reducing ACE-related trauma remains unknown. Concerns have been expressed, however, about the appropriateness of ACE screening, both from the standpoint of the accuracy of ACE measures, as well as its potential to improve child or parent outcomes in the absence of evidence-based treatments and interventions. Further work is necessary to establish the validity of ACE screening tools, as well as the appropriateness of ACE screening procedures, before ACE screening is put into widespread use.

Concerns have also been raised about the potential for TIC for improving child and parent outcomes. Although few would disagree that trauma-informed practices could add value to many frontline services, the extent to which TIC activities can provide specific benefits for

¹² See in the EIF Guidebook:

- Multisystemic Therapy (MST) <https://guidebook.eif.org.uk/programme/multisystemic-therapy>
- Functional Family Therapy (FFT) <https://guidebook.eif.org.uk/programme/functional-family-therapy>
- Multidimensional Family Therapy <https://guidebook.eif.org.uk/programme/multidimensional-family-therapy>
- TFCO Adolescent (TFCO-A) <https://guidebook.eif.org.uk/programme/treatment-foster-care-oregon-adolescent>
- TFCO Prevention (TFCO-P) <https://guidebook.eif.org.uk/programme/treatment-foster-care-oregon-prevention>
- Multisystemic Therapy for Child Abuse and Neglect <https://guidebook.eif.org.uk/programme/multisystemic-therapy-for-child-abuse-and-neglect>

parents and children has yet to be specified and rigorously tested. It is also not clear how many TIC activities represent additional value over current frontline activities. We therefore believe that further work is required to specify the relationship between TIC activities and specific child benefits, and that TIC models would benefit from greater specification in how they will increase child and family access to evidence-based treatments. In this respect, TIC may represent a potentially useful starting point for effective treatment, but should not be viewed as an end in itself.

We concluded this chapter by providing information about 33 interventions with causal evidence of preventing ACEs or reducing ACE-related trauma. These practices range from universal screening activities to intensive family therapies for children at the edge of care. While it is unlikely that any one of these activities would be sufficient for preventing and reducing ACEs at the population level, it is possible that various combinations could make a measurable difference if delivered to a high standard through system-wide strategies that are informed by community need.

Ideally, these strategies should also include measures which aim to increase community cohesion, reduce community crime, discourage racism and discrimination, improve housing quality, and increase families' access to high-quality services. Policies which directly address the structural determinants of health, such as poverty, unemployment and social inequality, are also crucial for ensuring that these efforts provide a lasting impact.

Summary: What we do and do not know about the potential of early interventions for preventing ACEs and reducing ACE-related trauma

What do we know about the potential of early interventions for preventing and reducing ACEs?

- Mental health screening with validated measures during the antenatal period is an effective universal method for identifying parents with mental health needs and helping them access evidence-based therapies.
- Antenatal support offered universally to couples expecting their first child has the potential to reduce family conflict and support positive child development.
- Universal interventions targeting social-emotional learning in schools have the potential to increase children's resilience, and to reduce health-harming behaviours, peer victimisation and bullying.
- Home visiting interventions offered at the targeted selected level to at-risk families has the potential to prevent ACEs from occurring in the first place.
- There is strong and consistent evidence showing that parenting interventions can reduce coercive family interactions contributing to child abuse and neglect.
- Interventions offered to divorcing couples have the potential to reduce family conflict and the stress associated with family breakdown.
- Various forms of individual therapy have been shown to reduce symptoms of trauma in children and parents who have been exposed to violence and other forms of adversity.
- Comprehensive interventions offered to families with a child at the edge of care have the potential to stop abuse and neglect and improve a variety of child and family outcomes.

What is not known about the potential of early interventions for preventing and reducing ACEs?

- We do not know the accuracy of ACE screening practices in identifying children who are in the most need of care.
- We do not know the potential of ACE screening practices to cause harm.
- The usefulness of ACE screening practices for informing treatment decisions has not yet been established.
- The extent to which trauma-informed care can reduce ACE-related trauma and improve other child and parent outcomes has not yet been robustly tested.
- The relationship between many trauma-informed approaches and improved client outcomes requires greater specification.
- We do not yet know the extent to which combinations of evidence-based interventions might improve child and parent outcomes at the population level.

What are the implications for research and practice?

- The diagnostic validity of ACE screening practices must be established before it is put into widespread use.
- Protocols for ACE screening practices must also be established and tested before ACE screening is put into widespread practice.
- The extent to which ACE screening could inadvertently cause harm must be thoroughly tested.
- The relationship between trauma-informed care and specific child and parent outcomes requires further specification and testing.
- Local areas should be encouraged to implement interventions with known evidence of preventing and reducing ACEs through system-wide strategies informed by local need.
- Further research is required to test the efficacy of new interventions targeting ACEs, particularly those addressing specific gaps in the evidence.
- Effective interventions must be embedded within comprehensive public health strategies that specifically address the wider determinants of health, such as poverty and social inequality.

TABLE S1

Interventions listed on the EIF Guidebook with robust evidence of preventing ACEs, reducing ACE-related symptoms or stopping the social mechanisms which contribute to ACEs

All interventions listed here have been assessed by EIF as having level 3 evidence or higher. Level 3 evidence is the threshold at which causality can be attributed to the intervention model through robust evaluation methods involving random assignment or similarly rigorous quasi-experimental designs. Level 4 evidence suggests that this evidence has been established in more than one study and that there is clear evidence of a long-term outcome. More information about the EIF Guidebook evidence standards can be found here: <https://guidebook.eif.org.uk/>

Intervention name	Description	Age range (years unless stated)	Model	Outcomes
Universal activities: Can be provided to all children and families, regardless of level of need. The impact of universal activities is primarily preventative. No screening or prereferral is necessary for children or parents to participate.				
Universal screening				
1 Perinatal mental health screening	Routine screening of mothers for mental health problems throughout pregnancy and the postpartum period.	Perinatal	Screening	2–9% reductions, in the risk of depression at follow-up (3–5 months) after participation in programs involving depression screening, with or without additional treatment components, compared with usual care. A 34% reduction in remission in depression symptoms when screening leads to referral of CBT.
2 Domestic violence screening	Routine screening for intimate-partner violence during the antenatal period.	Perinatal	Screening	Routine antenatal screening for intimate partner violence has been found to increase mothers' safety and improve childbirth outcomes when combined with evidence-based therapies aimed at increasing mother and child safety.
Co-parenting interventions				
3 Family Foundations	A group-based programme for couples expecting their first child where couples learn strategies for enhancing their communication, conflict resolution and the sharing of childcare duties. The improvement in interparental relationships, in turn, improves child outcomes.	Perinatal	Group-based	Level 4 evidence of medium improvements in infant soothability ($d = 0.35$ to $.47$), medium reductions in maternal symptoms of depression and anxiety ($d = .56$ and $d = .38$, respectively) and medium to large improvements in co-parenting behaviour and relationship satisfaction ($d = .47$ to $.7$) (Feinberg et al., 2008). Notably, significant reductions in interparental physical violence and parent-child psychological and physical violence were noted six months following intervention completion (Feinberg et al., 2015).
4 Schoolchildren & Their Families	A group-based programme for couples with a child entering primary school. Six couples attend 16 sessions of two hours' duration where they learn strategies for managing their child's behaviour and improving their co-parenting practices.	3–5	Group-based	Level 3 evidence of improved parenting behaviours, parental mood, and child behaviour, as well as reductions in marital conflict immediately after intervention completion. Improvements in couple communication and satisfaction and some child behaviours were observed at a 10-year follow-up.

5	Strengthening Families 10 to 14	A families-based programme that seeks to enhance family protective processes such as effective communication and child resistance to peer pressure as well as reduce family risk.	10–14	Family-based	Level 3 evidence of small ($d = .26$ to $.39$) reductions in alcohol initiation at 1- and 2-year follow-ups, respectively (Spoth et al., 1999) small ($d = .33$ and $.35$) reductions in aggressive behaviours at a four-year follow-up (Spoth et al., 2000), and significant improvements in academic success at a 6-year follow-up (Spoth et al., 2008). A 10-year follow-up additionally reported lower rates of substance use during sex, lower past year number of partners and lower lifetime sexually transmitted diseases (Spoth et al., 2014).
School-based interventions aimed at supporting children's social and emotional development and preventing health-harming behaviours					
6	ASSIST (A Stop Smoking in Schools Trial)	Influent students are recruited into a peer support programme where they are taught skills to dissuade their classmates from engaging in smoking in non-judgemental and empathic ways.	12–14	School-based	Level 3 evidence of a 79% reduction in smoking which was sustained at a two-year follow-up (Campbell et al., 2008).
7	Advanced Life-Skills Training	A schools-based curriculum which supports young people's personal self-efficacy and provides them with strategies for resisting tobacco, alcohol and illicit drug use.	11–14	School-based	Level 3+ evidence of a 23% reduction in self-reports of smoking, problematic drinking, marijuana use and illicit drug use at a five-year follow-up (Spoth, Randall, Trudeau, Shin, & Redmond, 2008).
8	Friends for Life (health led)	A schools-based curriculum which provides children with cognitive behavioural strategies for managing worrying behaviours and symptoms of anxiety.	7–13	School-based	Level 3 evidence of small reductions ($d = .22$) in reported symptoms of anxiety in low-risk children. No differences were found for high risk children (Stallard et al., 2014).
9	Friends for Youth	A school-based curriculum which uses workbook exercises, role plays, games, activities and quizzes, to help children to develop strategies for managing anxiety and stress.	12–13	School-based	Level 3 evidence of significant reductions in anxiety among young people receiving the intervention in comparison to those who did not.
10	Good Behaviour Game	A schools-based curriculum consisting of short team games designed to encourage prosocial behaviour and reduce disruptive behaviour.	5–11	School-based	Level 3+ evidence of reductions in aggressive and shy behaviour immediately post-intervention. Significant reductions in problematic drinking and antisocial behaviour, as well as a 50% reduction in suicide ideation were observed at a 14-year follow-up (Kellam et al., 2008; Wilcox et al., 2008). These findings have not been replicated in the UK, however (Ashworth et al., 2020).
11	Incredible Years Dinosaur Club	A programme delivered to small groups of children that uses coached play, videos and games to teach self-regulation and problem-solving skills.	4–8	Group-based	Level 3+ evidence of improvements in behaviour at home, at school and with peers and in social competence with peers for those who received the intervention, relative to those who did not (Webster-Stratton & Hammond, 1997).
12	Lion's Quest Skills for Adolescent Behaviours	A schools-based curriculum aimed at teaching cognitive-behavioural skills for building self-esteem and personal responsibility, making better decisions, resisting social influences, and increasing knowledge with regards to drug use and consequences. This is taught using a combination of role play, group work and discussion.	11–14	School-based	Level 3 evidence of 3% and 2.5% reduced lifetime and recent marijuana use, respectively, amongst those who received the intervention relative to those who did not at a one-year follow up (Eisen et al., 2003).

13	PATHs Preschool	A schools-based curriculum promoting emotional and social competencies and reducing aggression and behaviour problems in preschool children.	3–6	School-based	Level 3+ evidence of small improvements in work-related skills, social problem-solving skills and knowledge of emotions ($d = .17$, $d = .14$ and $d = .13$, respectively) immediately post intervention (Morris et al., 2014).
14	PATHs Elementary	A schools-based curriculum promoting emotional and social competencies and reducing aggression and behaviour problems in elementary children.	6–12	School-based	Level 3 evidence from multiple studies showing small to moderate reductions in child behaviour problems, including those associated with bullying lasting for at least two years (Malti, Ribeaud & Eisner, 2011; Ruby & Doolittle, 2010).
15	Positive Action	A schools-based social and emotional learning curriculum delivered through role-play, puppets, stories and activity sheets.	4–15	School-based	Level 3 evidence of a 31% reduction in substance use behaviour and a 36% reduction in violent behaviour after the intervention had been delivered for approximately 3 years (Li, K.-K., et al., 2011).
16	Olweus Bullying Program	A whole-school approach to bullying prevention, involving staff, students, parents, and the community in prevention efforts. For instance, staff receive training on how to intervene when bullying occurs and students receive class meetings focused on bullying prevention, peer relations, and pro-social behaviours.	5–18	School-based	Evidence of small to large reductions ($d = .4$ to $d = 1.9$) in reports of being bullied in grades 3 to 10 and moderate to large reductions ($d = .76$ to $d = 1.33$) in reports of bullying others in grades 4 to 11 (Limber et al., 2018 and Olweus et al., 1991) as well as reduced antisocial behaviour and improved wellbeing and satisfaction with school life (Olweus et al., 2004).
Selective interventions made available to families on the basis of selected demographic risks					
17	Family Nurse Partnership	FNP is a preventative home-visiting intervention for first-time teenage mothers and their children. Home visits begin from the time of the mother's first booking and then last until the child's second birthday.	Antenatal to age 2	Home visiting	FNP has level 4 evidence of improving a variety of child and maternal outcomes from multiple RCTs conducted in North America, Europe and the UK. Findings from a recently completed Dutch trial has specific implications for ACEs, showing a 91% decreased rate of child maltreatment, a 51% reduction in toddler internalising symptoms at age 2 and significant reductions in a variety of forms of domestic violence throughout the duration of the programme. These findings have not been replicated in the UK, however (Robling, Becker, & Butler, 2016).
Targeted interventions made available to children and parents on the basis of a pre-identified need					
Parenting interventions					
18	Empowering Parents/ Empowering Communities (EPEC)	A parenting intervention for disadvantaged families experiencing behavioural difficulties with a child between the ages of two and 11.	2–11	Group-based	Level 3 evidence of moderate reductions in coercive parenting behaviours (effect size = .69), alongside small reductions in problematic child behaviours (effect size = .39).
19	Level 4 Triple P Group & Standard	Enhanced Triple P (level 5) provides adjunctive interventions (alongside a level 4 Triple P programme) to address family factors that may complicate the task of parenting, such as parental mood and partner conflict.	2–5	Individual therapy	Level 3 evidence of significant reductions in coercive parenting behaviours and increasing parenting competence, as well as significant improvements in child behaviour, lasting for over three years (Sanders, Bor & Morawska, 2007).

20	Family Check-up for Children	A family-centred intervention that teaches parents to use parenting practices to support child competence, mental health and risk reduction.	2–5	Home visiting	Level 3 evidence from multiple studies of a reduction in aggressive and destructive behaviour sustained at the 1-year follow-up (Shaw et al., 2006). Additional benefits include improved parent-child interaction and reduced maternal depression (Shaw et al., 2008, 2009; Lukenheimer, 2008; Dishion et al., 2014).
21	Helping the Non-Compliant Child	An intervention that targets parents and their children where they learn how to manage unwanted child behaviour.	3–8	Individual therapy	Level 3 evidence of reductions in symptoms of ADHD and improvements in behaviour amongst children who received the intervention, relative to those who did not (Abikoff et al., 2015).
22	Hitkashrut	A co-parent training intervention aimed at reshaping parent-child interactions to reduce conduct problems.	3–5	Group-based	Level 3 evidence of a medium ($d = .76$) reduction in conduct problems immediately following the intervention, maintained at the 1-year follow-up ($d = .63$). Additionally, there were large ($d = .85$) and medium ($d = .47$) improvements in effortful control and callous/unemotional traits, respectfully, maintained at the 1-year follow-up (Somech et al., 2012). Additionally, parents reported improvements in their marital quality and parenting behaviours (Somech et al., 2016).
23	The Incredible Years Preschool Basic	A group parenting programme where parents learn strategies for interacting positively with their child and discouraging unwanted behaviour through mediated video vignettes, problem-solving exercises and structured practice activities.	3–6	Group-based	Level 4 evidence of medium to large ($d = .63$ and $d = .89$) reductions in number and intensity of conduct problems, respectively (Hutchings et al., 2007). This has been replicated in additional evaluations which identified medium improvements ($d = .31$ to $d = .75$) in child behavior (Scott et al., 2001; Gardener & Klimes, 2006) immediately following completion of the intervention as well as improvements in behavior and reading at 4 to 10 years post-intervention (Scott et al., 2014).
24	The Incredible Years School Age Basic	A group parenting programme that teaches effective parenting strategies for dealing with unwanted behaviour through group discussion, role plays, video vignettes and homework.	6–12	Group-based	Level 3+ evidence of a medium reduction ($d = .52$ and $d = .44$) in conduct problems and ADHD symptoms, respectively, and a halving of diagnosis of oppositional defiant disorder at a four-month follow-up (Scott et al., 2010). Additional parental outcomes included increased use of play, praise and rewards and time out and reduced harsh discipline ($d = .31$ to $d = .59$). Another level 3 evaluation (Webster-Stratton et al., 2004) identified small to medium reductions ($d = .35$ to $d = .67$) in conduct problems at home and at school as well as a large ($d = .81$) reduction in negative parenting and a medium ($d = .51$) increase in positive parenting by mothers.
Interventions for families where the parents are separating					
25	Family Transitions Triple P	Family Transitions Triple P (FTTP) is an intensive intervention that aims to prevent adverse outcomes for children following parental divorce. It can be delivered individually to families or as a group-based intervention.	2–18	Individual or group-based	Level 3 evidence of significant reductions in child behavior problems and coercive parenting behaviours in the first year and improved parental mood and co-parenting skills at the one-year follow-up.
26	New Beginnings	A group-based intervention for separating parents that aims to improve young people's internalising and externalising problems by teaching parents strategies for improving positive family communication and effective discipline.	3–18	Group-based	Evidence of a reduction in externalising and internalising problems when examined immediately after the intervention (Wolchik et al., 2000). Similar results were identified at the six-month follow-up with respect to externalising behaviour while at the 15-year follow up there was a reduction in the development of the internalising problems.

Therapeutic interventions				
27	Trauma-focused Cognitive Behavioural Therapy	A therapeutic intervention for children and families where participants learn cognitive strategies for managing negative emotions and beliefs stemming from highly distressing and/or abusive experiences.	2–18	Individual therapy
28	Multidimensional Family Therapy	An integrated therapeutic intervention for adolescents and families that also includes an optional community-focused component. It aims to develop problem-solving skills for dealing with issues that are occurring at the level of the adolescent, parent, family and community.	10–18	Individual therapy
29	Child-Parent Psychotherapy	A therapeutic intervention targeting mothers and preschool children who may have experienced trauma or abuse (e.g. domestic violence) or are otherwise at risk of behavioural and emotional problems.	3–5	Individual therapy
30	Child First	A 12-month home-visiting intervention combining Child-Parent Psychotherapy with other forms of social support to reduce the risk of child maltreatment in vulnerable families with young children.	6–36 months	Home-visiting
Specialist interventions offered as alternatives to families with a child at the edge of going into care				
31	Functional Family Therapy	A therapeutic intervention for young people involved in serious antisocial behaviour and/or substance misuse and their parents. Participants are taught behavioural strategies and skills including listening skills, anger management and parental supervision techniques to replace maladaptive behaviours (i.e. antisocial behaviour and substance abuse).	10–18	Individual & family therapy
32	Multisystemic Therapy	A therapeutic intervention for families with a young person who is at risk of going into care due to serious antisocial and/or offending behaviour. The focus is on using the parents as the primary agents of change, so the intervention includes strategies to improve the parents' effectiveness and the quality of the relationship with their child.	12–17	Individual & family therapy

Level 3 evidence from multiple studies suggesting reductions moderate to strong reductions in in symptoms of PTSD, anxiety and depression.

Level 4 evidence of reductions in externalising symptoms and cannabis dependence symptoms at a nine-month follow-up (Rigter et al., 2013 and Schaub et al., 2014). Additionally, at a 12-month follow-up there is evidence of moderate reductions in substance use problems severity ($d = .59$) and increases in drug abstinence as well as reductions in delinquency, externalising symptoms and felony arrests at an 18-month follow-up (Dakof et al., 2015).

Level 3 evidence from multiple studies of medium reductions in symptoms of child trauma (effect size = .63) and small improvements in child behaviour ($d = .24$). Maternal benefits included medium reductions (average $d = .40$) in maternal reports of trauma (Lieberman, Van Horn, & Ippen, 2005).

Level 3 evidence of four-fold reductions in child behavioural problems and a two-fold reduction in reports of child maltreatment at a three-year follow-up. Also, a three-fold reduction in parenting stress and four-fold reduction in symptoms of psychopathology at a 12-month follow-up (Lowell, Carter, Godoy, Paulicin, & Brigg-Gowan, 2011).

Level 3 evidence from multiple studies of reduced substance misuse (Waldron et al., 2001).

Level 4+ evidence from multiple, internationally conducted studies including a US evaluation demonstrating reduced youth offending, antisocial behaviour and psychiatric symptomology (Butler et al., 2011; Bourdin et al., 1995) as well as reduced criminal arrests and reduced criminal arrests and family-related civil court cases at a 14- and 22-year follow-up, respectively (Schaeffer et al., 2005; Sawyer et al., 2011). Additionally, an evaluation in Norway found reduced internalising behaviour and reduced delinquency immediately post-intervention, followed by reduced behavioural problems and reduced out-of-home placements at an 18-month follow-up (Ogden et al., 2004, 2006). These findings are not universally upheld, however. For example, a recent UK study observed that while MST reduced self-reported criminal behavior, this improvement was not significantly better than what was achieved by standard youth justice practice (Fonagy et al., 2018).

33	Multisystemic Therapy for Child Abuse and Neglect	An intensive treatment for families who have recently been reported to Child Protection Services. A key aim of the intervention is to help families assume greater responsibility for their behaviours and actively work to resolve serious family issues.	6–17	Individual & family therapy	Level 3 evidence of reduced neglect, psychological aggression, minor and severe assault, non-violent discipline, symptoms of PTSD, dissociative symptoms, internalising symptoms, total behaviour problems and increased placement stability post-intervention (Swenson et al., 2010).
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Note: All interventions listed here have been assessed by EIF as having level 3 evidence or higher. Level 3 evidence is the threshold at which causality can be attributed to the intervention model through robust evaluation methods involving random assignment or similarly rigorous quasi-experimental designs. Level 4 evidence suggests that this evidence has been established in more than one study and that there is clear evidence of a long-term outcome. More information about the EIF Guidebook evidence standards can be found here: <https://guidebook.eif.org.uk/>

7. Conclusions and recommendations

7.1 What we do know about ACEs

From our review of the evidence, we are confident that:

- **ACEs are harmful – full stop.** ACEs represent five forms of child maltreatment and five family difficulties associated with increases in children's exposure to trauma. For this reason alone, ACEs must be prevented and reduced.
- **ACEs are prevalent.** This means that stopping and reducing ACEs will require a substantial and concerted effort at the national and local level.
- **ACEs commonly co-occur in predictable clusters.** Understanding the nature of ACE clusters and their prevalence is important for understanding how to target interventions and develop effective intervention content.
- **ACEs are strongly associated with an increased risk of alcohol and substance misuse.** Prevention efforts aimed at reducing health-harming behaviours in early adolescence have the potential to mitigate this risk and reduce the negative impact of ACEs as children grow older.
- **ACEs are strongly associated with mental health and behavioural problems.** Efforts to prevent and reduce ACEs will therefore provide their greatest benefits through improvements in children's behaviour and mental wellbeing.
- **Other negative childhood circumstances, in addition to the original ACE categories, also predict poor adult outcomes.** These circumstances include child disabilities, low family income, school bullying, and community crime and deprivation. These other negative circumstances not only increase the risk of ACEs, but also contribute to poor child outcomes independently of the 10 original ACE categories. We must look beyond the original ACE categories to understand children's needs in a more holistic way.
- **ACEs are strongly associated with social inequalities.** These inequalities include poverty, unemployment and social discrimination. Social inequalities both increase the risk of ACEs and amplify their negative impact. This means that societal-level inequalities must be addressed for measures to prevent or reduce ACEs to have a lasting effect.
- **ACEs increase children's vulnerability to adult problems in ways which may not be evident during childhood.** This means that efforts to mitigate the impact of ACEs should be introduced before the negative effects of ACEs manifest themselves.
- **ACEs are perpetuated through social processes.** These social processes include coercive and abusive behaviours within families and peer victimisation occurring in schools. A growing number of interventions have robust evidence of preventing and reducing these negative social processes and increasing children's resilience.
- **ACE research and ACE policies have dramatically increased awareness of the negative impact of abuse and neglect on children's development.** This increased awareness provides a useful starting point for increasing the availability of effective interventions.

7.2 What we don't know

Despite dramatic increases in our understanding of ACEs, many questions remain. Currently, we do not yet know:

- **The prevalence of ACEs.** Although we know that ACEs are prevalent, we don't know *how* prevalent. In this review, we have reported that between 40–60% of the population will have experienced a single ACE before the age of 18 and between 4–20% will have experienced four or more. While the accuracy of these figures may be adequate for making the case for preventing or reducing ACEs, they are insufficient for knowing when or how to intervene with any precision. More research is necessary to understand the frequency of ACEs and the circumstances which contribute to them.
- **The prevalence of differing ACE clusters.** The original ACE study highlighted that ACEs cluster in predictable ways. However, we know relatively little about the prevalence of these clusters or how they interact with other childhood circumstances (such as poverty) in predicting poor adulthood outcomes. Answers to these questions are crucial for preventing ACE clusters, as well as developing interventions which address these clusters.
- **The extent to which ACEs predict physical health outcomes.** The ACE study authors originally argued that ACEs were the root cause of many physical conditions contributing to early death. In this report, we considered the strength of this argument in light the methodological limitations of retrospective survey designs used for investigating the prevalence of ACEs. These limitations suggest that the relationship between ACEs and poor health outcomes may not be as strong as was once assumed. More research, involving prospective study designs, is necessary to verify the strength of the relationship between ACEs and physical health outcomes.
- **The implications of neurophysiological evidence for preventing and reducing ACEs.** Recent advances in the neurosciences provide fascinating insight into how childhood trauma may negatively impact the immune and nervous systems. However, this knowledge is not yet sufficient for increasing the effectiveness of child and family interventions. More research is required to understand the potential of current and new interventions for influencing the neurophysiological processes thought to underpin ACEs.
- **The benefits of ACE screening practices.** Routine ACE screening is increasingly being used to identify children and parents who may be experiencing ACE-related trauma. However, we don't yet know the accuracy of these practices for identifying children in need of support and making appropriate treatment decisions. We also don't know whether ACE screening activities could inadvertently retraumatise children or cause other forms of harm. Further research investigating the safety and accuracy of ACE screening practices is therefore necessary before it is used more widely. Additionally, the usefulness of screening in the absence of effective interventions is viewed by many to be unethical. We therefore recommend that ACE screening should not be used unless there is a clear care pathway leading to effective treatment.
- **The potential for trauma-informed care for reducing ACE-related trauma and improving child and family outcomes.** While the principles underpinning trauma-informed care could potentially add value to many practices, the extent to which trauma-informed activities can prevent ACEs and reduce ACE-related symptoms of trauma has not been rigorously tested. Many trauma-informed activities require much further specification and testing before they are implemented more widely.

7.3 What should happen next?

Obtaining the answers to the above questions will be difficult and time-consuming. In the meantime, a lack of answers should not stop us from increasing access to interventions with proven evidence of preventing and reducing ACEs. These interventions include:

- **Activities which prevent ACEs from occurring in the first place.** We know that a number of family-based interventions have good evidence of reducing family conflict. We believe that the negative impact of some forms of parental conflict and mental health problems could be prevented or mitigated if these interventions were made widely available.
- **Activities which prevent or reverse many the social processes thought to perpetuate ACEs.** In previous chapters, we have identified interventions with robust evidence of reversing many of the negative social processes thought to contribute to ACEs, and of providing children with the skills to increase their resilience to stress and adversity.
- **Activities which aim to prevent or reduce health-harming behaviours.** There is strong evidence that childhood adversities increase the risk of smoking, problematic drinking and illicit drug use in adolescence and adulthood. It is likely that many of the social processes contributing to health-harming behaviours could be halted through universal, school-based interventions that help to discourage children from using dangerous substances and provide them with alternative coping strategies.
- **Therapies which directly treat symptoms of trauma.** There is clear evidence that a number of childhood adversities increase the risk of mental health problems in adolescence and adulthood. There are interventions with robust evidence of reducing symptoms of trauma and improving children's mental health, and we believe that these interventions should be made available to children experiencing ACE-related trauma symptoms, or in cases of established abuse and neglect.

Although we recognise that these activities will not entirely eradicate ACEs, we believe that they represent a tested and feasible way of preventing and reducing them at the population level. Nevertheless, it is also clear that the effectiveness of these interventions will be limited unless they are embedded within public health policies and strategies which systematically address the wider societal determinants of health, including poverty, unemployment and discrimination.

We also believe that comprehensive public health strategies must include measures which ensure that interventions are delivered to a high standard to children and families who most need them. These measures include investment into high-quality services and systems to ensure that they are:

- staffed by practitioners who are well-supported to meet the needs of families affected by ACEs; this support should include training and supervision, as well as the time necessary to establish positive and trusting relationships with children and families
- well-connected, through effective leadership, positive interagency working, robust care pathways and referral routes
- collecting information about community needs on a routine basis so that ACE-related interventions and activities are reaching the families who most need them
- monitoring and evaluating the effectiveness of ACE-related interventions and activities on a regular basis to make sure they continue to provide a positive impact.

A comprehensive public health strategy for tackling ACEs will also require significant, ongoing investment into research on childhood adversity. This research should include continued investigation into neurophysiological processes which potentially explain how childhood adversities are linked to poor adult outcomes, as well as the development and testing of interventions designed to prevent or reduce the impact of adversity at both the individual and population level.

Appendix A: What we know about the 10 ACE categories in terms of their prevalence and associated risks

A.1 Child abuse and neglect

The first five ACE categories entail various forms of child maltreatment perpetrated by a parent or other caregiver who has direct responsibility for the child. As we describe below, child abuse and neglect are common, affecting up to 25% or more of the child population, depending on the study. Here we consider the prevalence of each category of abuse and the strength of association¹³ commonly occurring at the level of the child, family, community and society.

Physical abuse

Physical abuse is defined as the intentional use of physical force against a child that causes, or has the potential to cause, physical injury (CDC, 2008; Barnett, Manly, & Cicchetti, 1993). Physical abuse is viewed as an episodic form of maltreatment, occurring as a result of family conflict, or as a form of physical punishment. Acts of physical abuse range from those which do not leave a physical mark on the child to those which cause permanent physical disability, disfigurement or death. Within the UK, estimates of physical child abuse range from 8.4% (Radford et al., 2011) to 17% (Ashton et al., 2016), depending upon the survey methodology used (see chapter 3 for a more complete description).

Child-level risk factors include the child's age, with service records consistently showing a disproportionate increase in the rates of physical abuse reported for babies and toddlers. However, it is not clear whether this increase is related to the frequency with which parents use physical force with their young children, or whether the heightened vulnerability of infants and toddlers means that seriously harmful abuse is more likely to be detected and be reported (Belsky, 1980; Finkelhor & Dzuiba-Leatherman, 1994).

Family-level factors which are found to be strongly associated with child physical abuse include whether the pregnancy was planned and the extent to which the parent harbours anger or resentment towards the child. For example, studies show that parents are more likely to use harsh or abusive discipline when they have unrealistic expectations of their child or misattribute their child's intentions. Additionally, these studies show that parents are more likely to misattribute their child's intentions when they are highly stressed (Beckerman, van Berkel, Mesman, & Alink, 2018; Beckerman, Van Berkel, Mesman, & Alink, 2017; Black, Smith Slep, & Heyman, 2001a; Milner, 2003).

¹³ Strength of association is reported within the recommendations of Stith et al. (2010), as strong if effect sizes are calculated as $r = .30$ or above, modest if $r = .20$ to $.30$ and weak $r < .20$, when effect sizes are reported. The term risk is used when describing increases in the relative risk as calculated by risk ratios and odds ratios.

Family-level factors which are more modestly associated with child physical abuse include parental substance misuse and mental health problems (Walsh, McMillan, & Jamieson, 2003; Widom & Hiller-Sturmhofel, 2001). Studies also show that physical abuse has a greater likelihood of being transmitted across generations in comparison to other forms of child abuse (Alink, Cyr, & Madigan, 2019; Madigan et al., 2019). Specifically, studies observe a modest but consistent link between a parent's childhood history of physical abuse and an increased likelihood of repeating this behaviour with their own children. However, this intergenerational association is modest and not predictive at the individual level, with studies showing that the vast majority of individuals who experienced physical abuse as a child do not go on to abuse their own children.

Additionally, studies show that rates of child physical abuse typically increase when families are also experiencing high levels of economic deprivation. However, it is important to recognise that this relationship is modest and the mechanisms linking family income to child physical abuse remain unclear (Stith et al., 2009). Nevertheless, it is commonly assumed that economic problems increase the amount of stress parents experience, which in turn lowers their patience and sensitivity towards their child (Whipple & Webster-Stratton, 1991; Conrad, Paschall, & Johnson, 2019). Low family income also frequently co-occurs alongside neighbourhood deprivation, which has also been shown to increase the amount of stress families experience (Coldwell, Pike, & Dunn, 2006; Evans, Boxhill, & Pinkava, 2008).

Sexual abuse

By definition, child sexual abuse encompasses any form of sexual activity between an adult and child under the age of consent, whether or not it is consensual (CDC, 2008; Basile & Saltzman, 2002). Sexual abuse constitutes a wide variety of activities involving a diverse range of circumstances – some of which are more common than others. For example, studies show that penetrative sexual contact between an adult and child under the age of 14 is rare, with most studies reporting prevalence rates of 3% or less (Radford et al., 2011; Gewirtz-Meydan & Finkelhor, 2019; see chapter 4). Moreover, the majority of these cases involve an adult familiar to the child who is not a biological parent. By contrast, children who are 14 years or older are at greater risk of organised sexual exploitation, or victimisation by same-age peers. Once definitions of sexual abuse are expanded, estimates for childhood prevalence increase to 10% or more (Ashton et al., 2016; Radford et al., 2011; Stoltenborgh, van IJzendoorn, Euser & Bakermans-Kranenburg, 2011).

This diverse range of childhood experiences creates challenges in identifying risk factors and understanding the potential impact of various forms of sexual abuse on children's development (Black, Heyman, & Smith Slep, 2001b). It is also worth noting that the vast majority of child sexual abuse is committed by teenagers and not adults. This finding suggests that the prevalence of some forms of abuse would not be captured through the original ACEs survey, which restricts the definition of sexual abuse to experiences between a child and an adult who is at least five years older (Finkelhor, Shattuck, Turner, & Hamby, 2014). As a result, the rates of sexual abuse reported in most ACE studies are unlikely to capture the full range of sexual maltreatment experienced by children.

Despite these definitional issues, there is consensus across studies showing that sexual abuse is associated with many of the same risk factors as other forms of child maltreatment (Vachon, Krueger, Rogosch, & Cicchetti, 2015). These risk factors include low family income and living in a deprived, urban community (Gewirtz-Meydan & Finkelhor, 2019). In the US, black African American children are also at an increased risk of child sexual abuse, as well as all other forms of child maltreatment (Gewirtz-Meydan & Finkelhor, 2019; Finkelhor, Shattuck, Turner, & Hamby, 2014; Sedlak et al., 2010). Additionally, girls are at far greater risk of sexual abuse than boys, with studies observing at least a two-fold relative risk of penetrative sex and a five-fold risk of experiencing any kind of sexual

abuse (Assink et al., 2019; Radford et al., 2011; Sedlak et al., 2010). Studies show that the increased risk for girls occurs primarily during the teenage years, with recent US studies indicating that boys and girls are at a similar risk of sexual abuse prior to the age of 13 (Geweritz-Meydan & Finkelhor, 2019).

Studies also show that circumstances which increase the opportunity for sexual abuse to occur present a specific risk. These factors include circumstances in which children are not under the direct care of their primary caregivers. For example, children who live away from their biological parents, either in foster or institutional care, are consistently shown to be more vulnerable to sexual abuse, and sexual exploitation in particular (Euser, Alink, Tharner, van Ijzendoorn, & Bakermans-Kranenburg, 2016). Similarly, studies show that institutionalised disabled children are at two- to three-fold increased risk of child sexual abuse in comparison to children who live with their parents (Jones et al., 2012; Westcott & Jones, 1999). Recent, high-profile cases also suggest that youth-oriented services (for example, religious or sports programmes) may also increase the opportunity for sexual abuse to occur (Bjørnseth & Szabo, 2018; Morris, 2019; Religion Media Centre, 2019). However, it should be emphasised that this risk is still much lower than the risk of sexual abuse occurring within the child's own home (Shattuck, Finkelhor, Turner, & Hamby, 2016).

At the level of the family, living with a step-parent or in a single-parent household is consistently shown to increase the likelihood of all forms of sexual abuse, with some studies suggesting a 20-fold increase in relative risk (Sedlak et al., 2010). Although the reasons for this association remain debated, researchers speculate that children living with a single or newly re-partnered parent often receive less emotional support than those living with both biological parents, thereby making them more vulnerable to grooming and sexual exploitation (Finkelhor, 1984; Hetherington, 1992). Historically, studies have shown that girls raised by single mothers are at an increased risk of sexual maltreatment from their mothers' romantic partners (Mullen et al., 1993).

Other family-level risk factors that are strongly associated with sexual abuse include the prior victimisation of a sibling, additional forms of child abuse in the home, and a parental history of child abuse. Factors which are modestly associated with an increased risk of sexual abuse include low parent-child attachment and overprotective parenting practices. Factors which have been found to weakly increase the risk of child sexual abuse include lower levels of parental education, lower levels of parental affection, and a lower sense of parenting competence (Assink et al., 2019).

Psychological abuse

The terms psychological abuse, emotional abuse and emotional maltreatment are used interchangeably to describe intentional adult behaviours which reject, belittle or demean a child's character or competence (Hibbard, et al., 2012; Vissing, Vissing, Straus, Gelles, & Harrup, 1991). Unlike physical and sexual abuse, psychological abuse is often ongoing and less explicit in its intent (Glaser, 2002). Examples of psychological abuse include various forms of verbal abuse (such as name calling or making unkind insinuations), ignoring (such as rejecting, isolating or stonewalling) and intimidation through the use of threats and hostile actions (such as door slamming or object smashing).

Many definitions of child psychological abuse also encompass psychological neglect, defined as the caregiver's failure to recognise and respond to the child's psychological and cognitive needs (CDC, 2008; Barnett, Manly, & Cicchetti, 1991). However, the literature is now increasingly differentiating psychological neglect from abuse, with studies confirming meaningful differences in their potential causes and impact on children's development (Clarke, 2015; Glaser, 2002; Shaffer, Yates, & Egeland, 2009). We therefore restrict the current discussion to psychological abuse and cover psychological neglect in the following section.

While psychological abuse has only been recognised as a form of child maltreatment since the mid-1980s, there is a growing consensus that the trauma associated with psychological abuse can be more severe and longer lasting than the trauma associated with physical abuse and sexual maltreatment (Taillieu, Brownridge, Sareen, & Afifi; 2016; Vachon, Krueger, Rogosch, & Cicchetti, 2015). Studies show that psychological abuse frequently co-occurs with other forms of child maltreatment, with some arguing that psychological abuse is integral to all other forms of child maltreatment (Claussen & Crittenden, 1991; Felitti et al., 1998; Schneider, Ross, Graham, & Zielinski, 2005). For example, a recent Canadian study observed that child psychological abuse was associated with a 29-fold increased risk of child physical abuse, a 10-fold increased risk of witnessing domestic violence, and a five-fold increase in the risk of sexual abuse (Taillieu, Brownridge, Sareen, & Afifi; 2016). Researchers now speculate that psychological abuse may be a unifying contributor to many of the negative adult outcomes consistently observed in longitudinal child maltreatment studies (Hamilton et al., 2013; Rosenkranz, Muller, & Henderson, 2012; Vachon, Krueger, Rogosch, & Cicchetti, 2015).

Additionally, there is clear evidence that psychologically aggressive parenting behaviours are common. For example, Straus & Field (2003) observed that over 90% of parents report having 'shouted, yelled or screamed' at their child at least 13 times within a period of a year. By contrast, reports of psychological abuse are much lower when maltreatment is more narrowly defined. For example, a recent Welsh ACE survey reported that less than a quarter responded yes to the question 'did a parent or adult in your home ever swear at you, insult you, or put you down?' (Ashton et al., 2016). Reports of emotional abuse were particularly low in the 2011 NSPCC prevalence study, when only 2–7% of children (depending on age) responded yes to questions asking whether they were ever made to feel really bad because a parent or guardian called the child/young person names, said mean things, said they did not want the child, broke or ruined the child's things, or threatened the child with violence (Radford et al., 2011).

As we further describe in chapter 3, these discrepancies illustrate the dramatic influence a study's design can have on its findings. Not only do these differences influence the rates of psychological abuse reported (for example, Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2013, who reported a 300-fold difference in prevalence rates across studies) they also impact what we know about their associated risk factors (Black, Heyman, & Smith Slep, 2001c).

Nevertheless, studies also show that psychological abuse is more frequent when families are experiencing high levels of stress because of a variety of other adversities, including low family income, parental substance misuse, parental mental health problems, a higher number of life stressors and social isolation (Chamberland, Fallon, Black, & Trocmé, 2011; Conrad, Paschall, & Johnson, 2019). Additionally, studies show that psychological maltreatment is common within families where there are increases in 'coercive' family interactions, characterised by high levels of interpersonal hostility and aggression (Clarke, 2015). The relationship between coercive family interactions, child abuse and other adverse childhood experiences is discussed in greater depth in chapter 5.

Neglect, including psychological neglect

Neglect is traditionally understood as an act of omission, whereby caregivers fail to support healthy child development for both intentional and unintentional reasons. Historically, definitions of neglect have involved situations where caregivers are chronically unable to meet their child's physical needs through the adequate provision of food, clothing and medical attention (Barnett, Manly, & Cicchetti, 1993; CDC, 2008). However, the definition of neglect has recently been expanded to include situations where the child is continuously undersupervised and psychologically neglected (Coohey, 2003).

Studies show that physical neglect is typically the most common form of child maltreatment reported in prevalence studies, involving 12–25% of the population, depending on the study's design and the way questions about neglect were asked (see chapter 3; Finkelhor, Turner, Shattuck, & Hamby, 2015; Radford et al., 2011; Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013; Vachon, Krueger, Rogosch, & Cicchetti, 2015; Vanderminden et al., 2019). Child neglect is also the primary reason a child protection plan is initiated.

Risk factors associated with physical child neglect are similar to those identified for physical child maltreatment (Stith et al., 2010). Factors which are most strongly associated with physical child neglect include negative parental attributions, higher levels of parenting stress, and higher levels of parent anger and reactivity. Studies also observe that neglect occurs more frequently when parents are experiencing a greater number of life stressors and have lower self-esteem. Parental incarceration is also strongly associated with an increased likelihood of child neglect (Mulder et al., 2018).

Parental mental health problems are shown to be modestly associated with increases in child neglect, with studies observing a weak but consistent relationship between neglect and a parental history of child maltreatment (Stith et al., 2010). Interestingly, parental substance misuse is not consistently associated with neglect, despite the fact that it is the primary reason neglected children are placed into care (Stith et al., 2010; Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013). This may have to do with the fact that most studies restrict the definition of neglect to situations where the child's physical needs are not met. However, when definitions of neglect are expanded to include a lack of supervision and emotional neglect, significant but modest associations between parental substance misuse and child neglect are observed (Clarke, 2015; Vanderminden et al., 2019). Studies also show that the risk of neglect increases when the child's parents are separated, or one parent is absent for long periods of time (Clarke, 2015; Vanderminden et al., 2019).

Neglect is also more frequent when parents are unemployed or experiencing economic hardship. However, studies show that the strength of this relationship can vary, depending on how neglect is defined and measured. When the definition of neglect is restricted to a child's physical needs, a weak but significant relationship between low family income and neglect is observed (Mulder et al., 2018; Stith et al., 2010; Schumacher, Smith Slep, & Heyman, 2001; Sedlak et al., 2010; Turner, Vanderminden, Finkelhor, & Hamby, 2019). However, when the definition of neglect is expanded to include psychological neglect and a lack of supervision, family income is no longer significantly associated with neglect, while parental substance misuse is (Vanderminden et al., 2019).

It is worth noting that all forms of neglect (physical, supervisory and psychological) are associated with an increased likelihood of polyvictimisation – meaning that neglected children are at a greater risk of experiencing other forms of maltreatment by their caregivers, as well as increased victimisation from their peers (Turner, Vanderminden, Finkelhor, & Hamby, 2019; Vachon, Krueger, Rogosch, & Cicchetti, 2015). For example, the original ACE study observed that physical neglect was associated with a six-fold increased risk of psychological abuse and four-fold increased risk of physical abuse (Dong et al., 2004). Physically neglected children are also at greater risk of sexual abuse, with supervisory neglect increasing the relative risk of sexual victimisation by seven-fold (Turner, Vanderminden, Finkelhor, & Hamby, 2019).

A.2 Family-level difficulties

The 10 original ACE categories also encompass five family-level difficulties: domestic abuse, parental mental health problems, parental substance misuse, parental incarceration and parental separation. Studies show that these difficulties commonly co-occur and often

increase the risk of child maltreatment. There is also consistent evidence showing that each of these difficulties is associated with increases in symptoms of child trauma, as well as an elevated risk of adverse adult outcomes.

Exposure to domestic abuse

Exposure to domestic abuse involves a child being present during an incident of threatening behaviour, violence, or abuse (psychological, physical, sexual, financial or emotional) between adults who are, or have been, intimate partners or family members, irrespective of sex or sexuality (World Health Organization, 2016). Although children exposed to domestic abuse may not be a direct recipient of physical force, watching another family member get hurt can frequently be as traumatic (Kitzmann, Gaylord, Holt, & Kenny, 2003; McTavish, MacGregor, Nadine Wathen, & MacMillan, 2016). For this reason, exposing children to domestic violence is recognised as a crime in most countries, independent of any crime that might also have been committed between other family members (Dubovitz, 2014).

Estimating the number of children who have been exposed to domestic abuse is difficult. This is because studies typically report prevalence rates involving adults, irrespective of whether children are present (Capaldi, Knooble, Shortt, & Kim, 2012). Estimates also differ on account of dramatic differences in the ways in which domestic abuse is defined and measured. For example, some studies restrict definitions to episodes of physical violence occurring between the child's caregivers, whereas others make use of expanded definitions which include various forms of psychological abuse, as well as abuse occurring between family members other than the child's parents (Dixon & Graham-Kevan, 2011).

Regardless of the definition, there is clear evidence that children's exposure to domestic abuse is common. For example, the 2011 NSPCC prevalence study observed that 17.5% of all children reported having witnessed abuse between their parents and 19.5% reported witnessing abuse between family members (Radford et al., 2011). Similarly, the US NATSCEV study consistently observes that 9–11% of all children will report being exposed to domestic violence within a single year, and 19–25% will report having witnessed it at some point during their childhood (Finkelhor, Turner, Shattuck, & Hamby, 2015; Hamby, Finkelhor, Turner, & Ormrod, 2011). The 2016 Welsh ACEs survey reported a rate of 16% on the basis of retrospective reports conducted with adults (Ashton et al., 2016).

Risk factors associated with domestic abuse include parental age (individuals under the age of 25 are more likely to engage in interpersonal violence in comparison to individuals who are older), parental drug and alcohol misuse, lower parental educational attainment, and families who are living in economically deprived circumstances (Abramsky et al., 2011; Costa et al., 2015; McTavish, MacGregor, Nadine Wathen, & MacMillan, 2016). Historically, studies have shown that women were more likely to be victims and men perpetrators. However, more recent and rigorously conducted studies observe that this pattern is the exception and not the rule (Dixon & Graham-Kevan, 2011). More frequently, domestic abuse occurs within cycles of family violence, perpetrated by both parents regardless of gender, as well as other family members. Within these cycles, children are not only at greater risk of witnessing abuse, but also of experiencing abuse and perpetrating abuse themselves (Chiesa et al., 2018; Jouriles, McDonald, Smith Slep, Heyman, & Garrido, 2008; Jaffee, Moffitt, Caspi, Taylor, & Arseneault, 2002; Smith Slep & O'Leary, 2005).

Three explanations have been proposed for these unfortunate family cycles. The first involves the presence of an 'aggressive individual' who is the primary perpetrator, where other family members respond violently as a form of self-defence (McCloskey, 2001). A second hypothesis assumes that aggressive behaviour is triggered by higher levels of stress, typically experienced by both caregivers (Jouriles & Norwood, 1995). Common sources of stress include economically deprived circumstances, higher levels of parental mental health or substance misuse problems, and community deprivation. A third explanation assumes

that one form of aggression creates an environment where other forms of aggression are viewed as an acceptable form of conflict resolution (Margolin & Gordis, 2003). From this perspective, increased aggression between the child's caregivers commonly 'spill over' into the dynamics between caregivers and their children.

Studies also show that child physical abuse, within the context of family violence, dramatically increases the likelihood of children engaging in antisocial behaviour during adolescence, as well as becoming involved in a romantic relationship characterised by violence and abuse (Johnson, Giordano, Manning, & Longmore, 2015; Margolin, Vickerman, Oliver, & Gordis, 2010; Widom, Czaja, & Dutton, 2014). In addition, children who have witnessed or experienced high levels of aggression and physical violence in the home are at greater risk of further victimisation outside of the home, including peer victimisation at school and being a victim of a violent crime in adulthood (Finkelhor, Ormrod, Turner, & Holt, 2009; Vu, Jouriles, McDonald, & Rosenfield, 2016). Exposure to domestic abuse is also consistently found to be associated with an increased risk of debilitating symptoms of trauma and other mental health risks (Evans, Davies, & DiLillo, 2008).

Parental mental health problems

Parental mental health problems are common. The WHO estimates that 10–14% of the adult population will experience a mental health problem at some point in their lifetime (Cooper, 2018; Ritchie & Roser, 2018). Within the UK, the 2014 Adult Psychiatric Morbidity survey estimated that 17% of all adults would have a mental health disorder during their lifetime. Similarly, 14% of participants in a recent UK ACE survey responded that they had grown up with a parent who had a mental health problem (Ashton et al., 2016; McManus, Bebbington, Jenkins, & Brugha, 2016).

It is important to emphasise that the majority of parents who experience mental health problems nevertheless have positive relationships with their children and their ability to parent is not negatively impacted. However, it is also clear that parental mental health problems are frequently implicated in a variety of poor child outcomes, including child self-regulatory difficulties, increases in emotional and cognitive problems, and increased levels of stress incurred through caring for or worrying about a parent who is unwell (Aldridge, 2006; Wu et al., 2019; Yan & Dix, 2016). The extent to which negative outcomes occur therefore varies depending on the severity of the parent's mental illness, the length of the illness, the child's contact with the parent, and the child's age when the mental illness occurs (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Sohr-Preston & Scaramella, 2006). Studies also show that the impact of parental mental illness is influenced by contextual factors, including whether other, non-mentally-ill adults are available to the child and whether the family is experiencing other adversities, such as economic hardship (Cleaver, Unell, & Aldgate, 1999; Goodman et al., 2011; Stein et al., 2008).

Parental mental illness is also associated with an increased risk of child maltreatment, although, as we have described in the previous sections, this risk is small. This risk is also influenced by the presence of other family difficulties, including parental substance misuse and domestic violence (Sidebotham et al., 2016).

Parental substance misuse

The term substance misuse applies to a wide variety of activities, some of which are illegal and life threatening and others which are not. Alcohol use is legal, with approximately 80% of the UK population reporting that they have had at least one alcoholic beverage in the previous year (Drink Aware, 2019). Findings from the 2014 Adult Psychiatric Morbidity survey (Drummond, McBride, Fear, & Fuller, 2016) observe that:

- 57% of adults drink responsibly, presenting no risk to themselves or others

- 19% of adults engage in hazardous drinking – this means that the drink to a level that increases the risk of an adverse event, hospitalisation or an alcohol-related accident
- 3.1% engage in harmful drinking, meaning that an adverse event has occurred as a result of drinking patterns
- 2.3% would be described as dependent, meaning that the individual craves alcohol and continues to drink despite harmful alcohol-related events, including an arrest or incarceration, domestic abuse, serious mental health problems or a physical illness.

The extent to which these statistics apply to parents of children remains unknown. While findings from the 2014 Adult Psychiatric Morbidity survey indicate that adults are less likely to engage in hazardous levels of drinking when they have children, other studies observe that the number of children living with a parent who engages in hazardous drinking may be as high as 3 million (Drummond, McBride, Fear, & Fuller, 2016; Manning et al. 2009). Studies also show that while the number of adults reporting occasional illicit drug use is much lower than those who drink alcohol (with a lifetime prevalence of 35%), the percentage of those involved in harmful or dependent use is similar to those with a harmful or dependent alcohol problem (Roberts, Lepps, Strang, & Singleton, 2016). Based on these figures, the Children's Commissioner (2020) estimates that 472,000 children (just under 5%) live with a parent who engages in harmful or dependent alcohol or drug use. Findings from the 2016 Welsh ACE survey suggest that this number may be higher, with 14% of all participants saying they grew up with a parent who was a problematic drinker (Ashton et al., 2016).

Parental substance misuse is thought to negatively influence children's development through two distinct pathways (Velleman & Templeton, 2016). First, parental substance misuse frequently reduces the caregivers' capacity to attend to their child's needs. This not only negatively affects the quality of the parent-child relationship but deprives the child of the psychological and cognitive support necessary for their development. Second, parental substance misuse often exposes children to other risks that are related to their substance-misusing behaviour, including domestic violence, parental incarceration, and physical and mental health problems.

Parental incarceration

National statistics are reported annually for the number of crimes committed each year and the number of individuals who are incarcerated. However, the extent to which these individuals are parents, or the number of children they have, remains unknown. The Children's Commissioner (2020) currently estimates the number of children with an incarcerated parent to be 200,000 on the basis of a Ministry of Justice study conducted in 2012 (Williams, Papadopoulou, & Booth, 2012). By contrast, findings from the 2016 Welsh ACE survey show a rate of 5% on the basis of retrospective surveys conducted with adults (Ashton et al., 2016).

Factors which increase the likelihood of parental incarceration include being raised in a home where other family members have committed a crime, having been placed in care, having experienced abuse or witnessed violence as a child, and having a parent with a substance misuse problem (Ng, Sarri & Stoffregen, 2013). Parents who are incarcerated are also more likely to be coping with a substance misuse problem or mental illness, be unemployed, be homeless, or live in areas where there are higher levels of crime and deprivation (Hawthorne et al., 2012).

Parental separation

Estimating the number of children with parents who are living apart is extremely challenging. Although the Office for National Statistics collects information on the divorces that take place each year, the extent to which divorcing adults have children is not routinely recorded. Moreover, not all parents choose to marry, and many married parents live separately, so not

all separations are routinely recorded. While statistics are kept on the number of households headed by single parents (which is currently 2,883,000 families, as reported by the Children's Commissioner), the extent to which this was a result of family breakdown is not recorded. The number of children raised in step-families is therefore not reliably known. Findings from the 2016 Welsh ACEs prevalence survey suggest that 20% of adults were raised in a home where their parents had separated (Ashton et al., 2016).

There is a robust link between financial pressures and marital distress (Conger, Rueter, & Conger, 2000). However, this link may not be related to income per se, but rather the stress partners experience when they are unemployed (Killewald, 2016). In terms of couples with children, it has been suggested that the period during which the first child enters mid-adolescence (around 14 years of age) is a low point for couple satisfaction and therefore a sensitive period for parental separation (Steinberg & Silverberg, 1987).

Appendix B: The relationship between childhood adversities other than ACEs on adult outcomes

Studies show that a wide variety of factors occurring at the level of the child, family, community and society contribute to children's exposure to trauma and increase the risk of negative adult outcomes, both in combination with the 10 original ACE categories and independently of them. Here we describe how these other adversities increase the likelihood of ACEs and also predict poor adult physical and mental health outcomes.

B1. Child-level risks

Low birth weight

Low birth weight is consistently associated with an increased risk of poor physical health and cognitive difficulties throughout childhood. Historically, studies show that a birth weight of less than 5.5 pounds reduces the likelihood of finishing secondary school by at least one-third and increases the risk of reduced earnings throughout adulthood (Johnson & Schoeni, 2011). Studies also show that low birth weight can more than double the risk of having a stroke and other life-threatening diseases by the age of 50 (Martinson & Reichman, 2016).

The relationship between low birth weight and poor adult outcomes is complex and multidetermined. Researchers speculate that the development which takes place during the antenatal period establishes or 'programmes' patterns of physiological response which continues throughout child- and adulthood (Barker, 1995). Healthy antenatal development increases children's resilience to disease, whereas unhealthy antenatal development ultimately weakens it (Kwoon and Kim, 2017). Factors contributing to unhealthy antenatal development include poor maternal nutrition and the presence of toxins such as alcohol, drugs and cigarette smoke (Asmussen & Brims, 2018). High levels of maternal stress are also associated with poor birth outcomes, including low birth weight and a preterm birth (Glover, 2015).

Studies show that many of the factors which predict low birth weight also negatively impact children's postnatal development (Paranjothy et al., 2018). These factors include low family income, young parenthood (see below) and ongoing exposure to cigarette smoke. Low birth weight has also been shown to increase the risk of child maltreatment, with studies confirming a graded, inverse relationship between the child's weight at the time of birth and risk of inclusion on the child protection register at some point during childhood (Puls et al., 2019; Spencer, Wallace, Sundrum, Bacchus, & Logan, 2006).

Disability

Over 900,000 children were identified as having a special educational need or disability (SEND) in 2019 (DfE, 2019). Low birth weight, exposure to infectious diseases and genetic factors are all associated with an increased risk of a childhood disability. Physical and

cognitive disabilities in turn are consistently associated with a wide variety of other negative outcomes throughout the life course (Schieve et al., 2016). For example, having a childhood disability has been found to more than double the risk of stroke and coronary artery disease in adulthood, as well as increase the risk of smoking by 50% and problematic drinking by 80% (Pharr & Bungum, 2012).

As we have described above, there is also a strong association between childhood disability and the risk of child maltreatment. Studies in fact show that children with a diagnosed physical disability are at an 80% increased risk of sexual abuse and a 20% increased likelihood of physical abuse, independently of their institutionalisation status (Danese et al., 2016; Austin, Herrick, Proescholdbell, & Simmons, 2016; Berg et al., 2019; Jones et al., 2012). Physical abuse, in turn, is associated with an increased likelihood of physical disabilities in adulthood (Campbell, Walker, & Egede, 2016).

B.2 Family-level risks

All 10 ACE categories involve behavioural or mental health difficulties on the part of the child's parents and other close family members. These behaviours, in turn, are associated with a wide variety of parent characteristics which include young parental age and a previous history of ACEs.

Parental history of ACEs

There is consistent evidence showing that ACEs are 'shared' across generations (Bowers & Yehuda, 2016). For example, studies show that parents with a history of 6+ ACEs are 30% more likely to have a child with adult health problems (Lê-Scherban, Wang, Boyle-Steed, & Pachter, 2018). Additionally, parents with a history of abuse are at greater risk of abusing their own children, although findings across studies are mixed and often interact with other risk factors (for example community violence; Assink et al., 2018; Madigan et al., 2019; Savage, Tarabulsy, Pearson, Collin-Vézina, & Gagné, 2019). In particular, there is growing evidence showing that stable and nurturing intimate relationships can work to break intergenerational cycles of child abuse (Jaffee et al, 2013).

Adolescent parenthood

4,290 teenage mothers were reported for the year 2017/18 (PHE, 2019).¹⁴ The original ACE study observed a strong and graded relationship between ACEs and an increased risk of adolescent parenthood (Hillis et al., 2004). A single ACE was shown to increase this risk by between 20 and 60%, whereas 4+ ACEs more than doubled this risk. Adolescent parenthood, in turn, is associated with a wide variety of negative circumstances which increase the risk that their children will experience ACEs. These include an increased likelihood of economic disadvantage, birth complications, parental depression and substance misuse, and engaging in harsh and insensitive parenting (Chen et al., 2007; Dennis & Mollborn, 2013; Sidebotham, Heron, & the ALSPAC Study Team, 2006).

Low family income

There is strong and consistent evidence showing that low family income is highly associated with all 10 of the original ACE categories (Marmot & Bell, 2012; Pelton, 2015; Pickett & Wilkinson, 2015; Walsh, McCartney, Smith, & Armour, 2019). Not only does low family income increase the likelihood of adverse childhood experiences before the age of 18, but experiencing multiple ACEs, in turn, increases the probability that individuals will

¹⁴ See: <https://fingertips.phe.org.uk/profile/child-health-profiles/data#page/11/gid/1938133228/pat/6/par/E12000004/ati/202/are/E06000015/iid/90811/age/244/sex/2>

be economically disadvantaged by the time they reach adulthood (Allen & Donkin, 2015). The Children's Commissioner (2020) reports just under 600,000 children are living in economically deprived circumstances.

While the original ACE study did not directly assess the relationship between income and childhood adversity, studies conducted since that time consistently observe a graded relationship between economic disadvantage and an increased risk of each individual ACE, as well as the presence of 4+ ACEs. For example, a 2013 national survey observed that adults living in the most deprived English quintile were three times more likely to report experiencing 4+ ACEs in comparison to those living in the least deprived quintile (Bellis et al., 2013). Similarly, findings involving the Growing Up in Scotland cohort study observed that children growing up in the most deprived quintile were 10 times more likely to experience 3+ ACEs by the age of 8 in comparison to those living in the least deprived quintile (Marryatt & Frank, 2019).

Studies also show that economic disadvantage, irrespective of ACEs, can be an ongoing source of childhood trauma and stress (Chilton et al., 2013). For example, studies show that children in low-income households not only worry about the lack of food and other material resources, but also about the stress their parents experience on account of financial concerns (Bernard et al., 2018; Wade, Shae, Rubin, & Wood, 2014). Additionally, studies show that a general lack of food, and nutritious food in particular, is consistently associated with a variety of negative health outcomes, including a 30–90% decreased resilience to disease and an increased risk of obesity (Cook & Frank, 2008).

B.3 School- and community-level risks

Peer victimisation

Findings from the most recent 2011 NSPCC UK abuse and neglect prevalence survey show that peer victimisation is one of the most common forms of child victimisation (Jackson, Browne, & Joseph, 2016; Radford et al., 2011). The Children's Commissioner (2020) reports that 800,000 children say they have been bullied in any given year and 2.5 million children will have experienced some form of bullying before the age of 18.

Peer victimisation includes various forms of bullying and physical assault, as well as peer rejection and social isolation. Studies have also found that children often perceive peer victimisation to be as traumatic as caregiver-perpetrated abuse (Wade, Shea, Rubin, & Wood, 2014). Moreover, studies show that the trauma associated with peer victimisation can endure well into adulthood (Copeland et al., 2014; Lereya, Copeland, Costello, & Wolke, 2015).

Additionally, studies show that the lifelong impact of peer victimisation is similar to that of other ACEs. For example, peer victimisation is highly correlated with a wide variety of health-harming behaviours during adolescence, including smoking, binge drinking, illicit drug use and unsafe sex. Recently, peer victimisation and cyberbullying have been linked to increases in teen suicide attempts (Arseneault, 2018). Peer victimisation is also strongly correlated with increases in behavioural and emotional problems in early adulthood (Wolke, Copeland, Angold, & Costello, 2013). For example, findings from the British National Child Development Study observe that high levels of peer victimisation during childhood increase the risk of having a physical and mental health problem in mid-adulthood by at least 50% (Takizawa, Maughan, & Arseneault, 2014).

However, it is also clear that childhood experiences of peer victimisation do not uniformly predict poor adult outcomes (McDougall & Vaillancourt, 2015). Although childhood victimisation has the potential to negatively impact all of a child's social experiences (Kochenderfer & Ladd, 1996; Snyder et al., 2003), trajectories of victimisation can be reversed when replaced by positive social interactions (Goldbaum et al., 2007; Hanish & Guerra, 2002; Juvonen et al., 2000).

Exposure to community violence and other traumatic events

Exposure to violence is a particularly traumatic adverse childhood experience. Exposure to violence includes the traditional ACE categories of physical abuse and witnessing domestic violence, but also peer victimisation and various traumatic events occurring outside of the home. Examples of such events include community violence (for example, street crime, gang violence and rioting), war, and the death and suffering associated with natural disasters (Kumar & Fonagy, 2013; Wade et al., 2016). Exposure to violence not only poses a direct threat to children's immediate safety but interferes with their ability to perceive their surroundings as safe and secure (Margolin & Gordis, 2000; Margolin et al., 2009).

Being the recipient of or witnessing violent behaviour is consistently associated with an increased likelihood of post-traumatic stress disorder (PTSD) and other mental health problems (Aiyer, Heinze, Miller, Stoddard, & Zimmerman, 2014; Foster & Brooks-Gunn, 2009; Mazza & Reynolds, 1999; Peckins, Dockray, Eckenrode, Heaton, & Susman, 2012). Studies show that chronic exposure to community violence can also desensitise children to violence which, in turn, increases the risk that children will perpetrate violence themselves (Mrug, Loosier, & Windle, 2008). Emerging evidence shows that exposure to community violence also increases the risk of various health problems in a manner similar to experiencing 4+ ACEs. For example, a recent systematic review observed that high levels of community violence more than tripled the risk of asthma, doubled the risk of sleep problems and increased the risk of high blood pressure by 150% (Wright, Austin, Booth, & Kliewer, 2016).

Community deprivation

Community crime and violence are key features of disadvantaged communities. However, children do not need to actually witness or be a victim of crime for community deprivation to negatively impact their health and wellbeing. In this respect, studies show that other features of community deprivation, such as a lack of safety, poor housing and reduced access to high-quality resources, both directly and indirectly impact children's development in a manner similar to that of experiencing 4+ ACEs (Evans & English, 2002; Jaffee et al., 2012; Newbury et al., 2016; Odgers & Jaffee, 2013; Sandel et al., 2018). The Office for National Statistics estimates that approximately 4 million children are living in the 25% most deprived communities (Children's Commissioner, 2020).

For example, overcrowded housing and related environmental hazards are continually shown to directly cause poor birth outcomes and a variety of infectious and debilitating diseases (Asmussen & Brims, 2018; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005; Ezeh et al., 2017; Harker, 2006). Living in an unsafe neighbourhood is also linked to increases in children's stress-related cortisol (Bush, Obradović, Adler, & Boyce, 2011; Margolin & Gordis, 2000). Disadvantaged communities often have restricted access to the resources, such as schools, hospitals and health clinics, which would otherwise support healthy child development (Evans & Kantrowitz, 2002). Additionally, children are less likely to play outdoors in communities where there are higher levels of crime (Molnar, Gortmaker, Bull, & Buka, 2004). Reduced opportunities for outdoor play, in turn, potentially increase the risk of poor physical health and obesity in adulthood (Lovasi, Hutson, Guerra, & Neckerman, 2009).

Disadvantaged communities also indirectly influence children by increasing the stress experienced by their parents. For instance, studies show that high levels of community-related stress increase the likelihood that parents will respond harshly to their children. Harsh parenting, in turn, increases the likelihood of aggressive child behaviour (Coldwell, Pike, & Dunn, 2006; Evans, Boxhill, & Pinkava, 2008).

High levels of community-related stress are also associated with an increased risk of child abuse and neglect (Coulton, Richter, Korbin, Crampton, & Spilsbury, 2018; Hanson, et al., 2006; Sidebotham, Heron, & the ALSPAC Study Team, 2006). For example, studies

show that child maltreatment risk increases when families move from safe to unsafe neighbourhoods (Finkelhor, Ormrod, & Turner, 2007b; Lynch & Cicchetti, 1998).

It is worth noting that the impact of disadvantaged communities can be reversed when families move from disadvantaged to less-disadvantaged communities, irrespective of income. For example, findings from the Moving to Opportunity experiment in the US observed that children in low-income families who were randomly assigned vouchers to move to better communities were more likely to attend university and earn a higher income than those who remained in disadvantaged communities, despite their parents not earning any additional income (Chetty, Hendren, & Katz, 2016).

B.4 Societal-level risks and disparities

Racism and other forms of social discrimination

Racism, including the systematic discrimination of individuals on the basis of social characteristics (such as gender, sexual orientation, and so on) encompasses a wide variety of experiences which include (1) being a direct recipient of aggressive behaviours on the basis of race or other social characteristics, (2) discrimination against an ethnic or minority group of which one is a member, (3) witnessing discrimination directed towards a family or friend, and (4) expectations of discrimination that have become internalised into an individual's worldview through experiences over time (Paradies et al, 2015).

Epidemiological studies consistently observe substantial disparities in the physical health, mental health, education and employment of adults who are affiliated with socially discriminated groups (Williams, Priest, & Anderson, 2016). These disparities can be explained, in part, by co-existing inequalities in the adversities experienced by many minority groups. For example, many ethnic minorities also live in disadvantaged communities. Nevertheless, findings from a series of recent systematic reviews confirm that health and mental health outcomes remain disproportionately worse for members of socially discriminated groups even when these other disparities are statistically taken into account (Bailey et al., 2017; Wallace, Nazroo, & Bécaries, 2016).

In adolescents, experiences of discrimination are specifically associated with increases in binge drinking, depression, adolescent pregnancy and engaging in antisocial behaviour (Priest et al., 2013). In adults, reports of childhood racism more than double the risk of a variety of mental health problems, including suicidal ideation and PTSD. A graded relationship between experiences of racism and body weight has also been confirmed (Paradies et al. 2015).

Appendix C: Recent evaluations of routine ACE screening in North America and the United Kingdom

ACE screening is now increasingly offered as a way of increasing awareness of ACEs and assessing child and family need. In this appendix, we describe findings from several recent evaluations of ACE screening practices conducted in North America and the UK.

C.1 Routine screening in North America

ACE screening at the Bayview Child Health Center-Center for Youth Wellness in California

ACE screening in California was first introduced through the Kaiser Permanente health questionnaire and is now being rolled out across the state. The Bayview Child Health Center-Center for Youth Wellness (BCHC-CYW) has been particularly influential in advocating for universal screening and has developed the Integrated Pediatric Care Model through which ACE screening should take place. The state of California has recently committed \$95 million in funding so that the model can be implemented in all state health agencies by the end of 2020 (Loudenback, 2019).

TABLE C.1

The Center for Youth Wellness Adverse Childhood Experiences Questionnaire (CYW ACE-Q)

Screening tool	Description	Section One	Section Two	Age range	Completed by
CYW ACE-Q Child	17-item instrument, 2 sections, 2–5 minutes to complete	Original ACEs (1–10)	7 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination)	Children: birth to 12 years old	Parent/caregiver on behalf of child
CYW ACE-Q Teen	19-item instrument, 2 sections, 2–5 minutes to complete	Original ACEs (1–10)	9 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination, youth intimate partner violence, youth arrest/incarceration)	Youth: 13 to 19 years old	Parent/caregiver on behalf of teen
CYW ACE-Q Teen Self-Report	19-item instrument, 2 sections, 2–5 minutes to complete	Original ACEs (1–10)	9 additional ACEs (foster care, bullying, parent/guardian death, separation due to deportation/immigration, serious medical procedure/illness, violence in neighborhood, discrimination, youth intimate partner violence, youth arrest/incarceration)	Youth: 13 to 19 years old	Youth (self-report)

The Bayview model assumes that all children will participate in screening during a routine paediatric visit. Parents with a child under the age of 12, or adolescents aged 12 or over, complete the Paediatric ACEs and Related Life-Events Screener (PEARLS) via computer-aided technology. This screener is a modification of the original ACE questionnaire, based on the results of a feedback from practitioners and caregivers who participated in a rapid-cycle evaluation (Koita et al., 2018). The tool includes modifications of the 10 original ACE questions, as well as additional questions regarding bullying or community violence (see table C.1). The instrument’s validity as a diagnostic screening tool has not yet been explicitly tested, although BCHC-CYW has stated they will test this as the measure is implemented.

Three versions of the questionnaire are available for use with different target populations (that is, for children or adolescents) and different informants (for the individual or parent/caregiver). The tool is ‘de-identified’, meaning that service providers only receive the total number of ACEs a patient has experienced, not a breakdown of the individual ACEs that make up this score.

The information gathered via the screening tool is used in combination with an assessment of the child’s symptomology (see table C.2) which will inform decisions about appropriate care. Specifically, those scoring below four on the ACE questionnaire without clinical symptoms receive anticipatory guidance that includes information about ACEs, toxic stress and strategies for reducing exposure to ACEs and stress management, including the importance of consistent, supportive relationships. Those with an ACE score of four or more, or who score below four with clinical symptoms, are referred to a multidisciplinary clinical team who develop and implement a treatment plan for the individual. This treatment can include parental education, evidenced-based interventions such as Child-Parent Psychotherapy or Cue-Centred Therapy, and referral to a psychiatrist if medication is needed (see table 6.3). Families are also offered additional home visits and help with transportation to the child’s school if it is determined that this would be beneficial.

TABLE C.2
Symptomatology accompanying ACE screening

Symptomatology checklist
<input type="checkbox"/> Sleep disturbance
<input type="checkbox"/> Weight gain or loss
<input type="checkbox"/> Failure to thrive
<input type="checkbox"/> Enuresis, encopresis
<input type="checkbox"/> Constipation
<input type="checkbox"/> Hair loss
<input type="checkbox"/> Poor control of chronic disease (eg asthma, diabetes)
<input type="checkbox"/> Developmental regression
<input type="checkbox"/> School failure or absenteeism
<input type="checkbox"/> Aggression
<input type="checkbox"/> Poor impulse control
<input type="checkbox"/> Frequent crying
<input type="checkbox"/> Restricted affect or numbing
<input type="checkbox"/> Unexplained somatic complaints (eg headache or abdominal pain)
<input type="checkbox"/> Depression
<input type="checkbox"/> Anxiety
<input type="checkbox"/> Interpersonal conflict

TABLE C.3**Center for Youth Wellness Clinical Program Services**

Intervention	Description
Clinical evaluation	Care coordinators administer a set of comprehensive intake forms and clinical tools to evaluate behavioral and mental health status, needs, and strengths of patients, and families.
Home visits	Care coordinators and nurses engage with families at home and at school, recognizing barriers such as lack of access to childcare and transportation.
Education	Clinical team members offer targeted education that helps families better understand the causes and symptoms of chronic stress and provide strategies to mitigate the kind of stress that can hurt children's health and wellbeing.
Psychotherapy	Therapists provide a variety of evidence-supported treatments and promising practices that share core principles of culturally competent, trauma-informed therapy that are appropriate for children and families from diverse cultural backgrounds, including Child-Parent Psychotherapy and Cue-Centered Therapy.
Wellness nursing	Nurses provide education to families about the impacts of adverse childhood experiences and toxic stress on health and wellness. They coordinate specialty care appointments, often accompanying patients/families to see specialists, and provide consultation on strategies for attaining, maintaining, or recovering optimal health.
Psychiatry	Psychiatrists provide medication evaluations of children and caregivers and offer consultation to Bayview Child Health Center physicians and Center for Youth Wellness (CYW) staff as needed.
Biofeedback	A biofeedback specialist works directly with children and teens to build awareness and control over body processes such as muscle tension, blood pressure, and heart rate. Identification and monitoring of these body processes helps patients recognize and better regulate their 'fight or flight' stress response.
Referrals	Care coordinators make appropriate referrals for CYW clinical services and also coordinate referrals to high-quality institutional partners who also use an ACE-informed service lens.

ACE screening at Johns Hopkins Children's Hospital in Maryland

ACE screening with the CYW ACE-Q is also implemented at the Johns Hopkins Children's Hospital in Baltimore, Maryland. Here, it has been integrated into a service 'map', whereby a score of four or more leads to additional support. The ACE questionnaire is administered by a practitioner, rather than a computer-aided device. Depending on the family's needs, additional support might include counselling, a resource handout, and the opportunity for referral into additional treatment. The extent to which this support is evidence-based, however, is not clear.

The Johns Hopkins practice has recently undergone feasibility testing, observing that while the screening tool could potentially identify high-risk children and parents, the service had difficulty reaching its service targets (successfully screening 60% of families, rather than their target of 80%), partially because of the time it took to implement the tool. Furthermore, the study found that use of the tool did not increase practitioners' understanding of the ACE evidence, nor did it increase practitioners' comfort in discussing abuse and neglect with families. The evaluators concluded that the practice could have merit if it was accompanied by more intensive practitioner training and was integrated into a care protocol which specifically led to evidence-based treatments (Marsicek et al., 2019).

ACE screening in a home visiting service for vulnerable families in the state of Wisconsin

ACE screening is currently being used with all families participating in the US state of Wisconsin's Family Foundations Home Visiting (FFHV) Program. The programme provides evidence-based home visiting interventions to all families meeting the eligibility criteria, defined as being twice below the poverty line. ACE screening takes place through the use

of the Childhood Experiences Survey (CES), which is a modification of the original ACE screening tool developed for use in individual practice.

A recent evaluation of the tool with 1,678 participants observed that, by and large, families found the questions to be acceptable (Mersky, Lee, & Gilbert, 2019). However, over one-third of the participants expressed some discomfort with each of the ACE questions, with the exception of the question regarding parental separation. Additionally, there was a graded association between the level of discomfort and the number of ACEs families were experiencing. In other words, families who were experiencing a greater number of ACEs were more likely to feel uncomfortable answering the ACE questions. Parents diagnosed with depression, irrespective of ACEs, also expressed discomfort with the questions.

The study additionally observed that practitioners were uncomfortable with some of the items, and that their level of discomfort corresponded with their client's discomfort. The authors concluded that while it might be possible to minimise practitioner discomfort through further training, more research was necessary to understand the risks and benefits of asking clients about ACEs and other traumatic life events.

The EmbrACE programme in Calgary, Canada

The EmbrACE programme in Calgary, Canada, is an example of ACE screening leading to a specific group-based intervention. Patients complete a questionnaire involving the 10 original ACE categories. Those receiving a score of three or higher are then referred to a six-week group intervention which provides patients with strategies for developing resilience, coping with stress and building positive, interpersonal relationships (Pusch et al., 2017).

The full programme, incorporating both the ACE screening and the six-session group intervention, has recently completed a pre/post pilot. The study observed significant improvements in patients' reported symptoms of anxiety, depression, emotion regulation and resilience, through the use of validated measures such as the GAD-7 and CD-RISK. While this evaluation did not include a comparison group, a more rigorous randomised trial is underway.

C.2 Routine ACE screening within the UK

REACH in Northern England and Wales

In 2013, Lancashire Care NHS Foundation Trust (LCFT) developed a training model on Routine Enquiry about Adversity in Childhood (REACH). The model has five key elements (Warren Larkin Associates, 2020).

- **Stage one** is a co-produced audit and evaluation of an organisation's readiness to engage in routine enquiry. This helps to identify any potential systemic barriers and supports organisational buy-in.
- **Stage two** involves consideration of change management processes and a review or design of an organisation's specific systems and processes required to support effective and safe enquiry.
- **Stage three** involves the delivery of REACH training, which is tailored to the organisation's specific needs, in terms of content and delivery methods.
- **Stage four** involves follow-up support from the REACH team to the organisation, including consultation and supervision for staff and leadership teams, to ensure effective implementation.

- **Stage five** involves support from the REACH team in the evaluation of REACH to assess the quality of implementation, the degree of practice change and the programme's impact on service users.

REACH training includes the use of routine enquiry to increase awareness of ACEs and help clients to access additional treatment if necessary. REACH provides both the screening tool and training for implementing the tool. The tool is based on the original ACE questionnaire, although participating organisations are permitted to amend it as they see fit. For instance, questions about bullying have been added by some services, and one organisation has replaced the questionnaire with open-ended questions about childhood experiences (such as, 'tell me about your best and worse childhood memory').

REACH is currently being implemented across a wide variety of universal and targeted services in North West England, including GP settings, substance misuse services and domestic abuse support. Several evaluations of REACH have been conducted to date, observing practice benefits which include increased practitioner knowledge of ACEs and increased confidence in asking about ACEs and knowing how to respond appropriately (for example, Hardcastle & Bellis, 2018; Pearce, Murray, & Larkin, 2019).

However, some studies have also revealed uncertainties about the rationale of the practice and its overall effectiveness. For example, a recent evaluation of REACH within Blackburn's CAMHS drug and alcohol service observed that some practitioners were concerned about the potential of causing harm by asking the ACE questions at the wrong time or in the wrong way, as well as the ethics of ACE screening in the absence of an explicit referral pathway (Quigg, Wallis, Butler, 2018). Practitioners were also concerned that the ACE cut-off score meant that some vulnerable individuals reporting a low number of ACEs might be missed.

Routine ACE screening with health visitors in Wales

Routine ACE screening is now routinely used by health visitors in Anglesey, Wales. This process involves mothers completing the original 10-item ACE questionnaire during the six-week or six-month health visitor check, after which the health visitor reflects on the response and offers the opportunity for discussion, irrespective of ACE score. This discussion includes the potential impacts of ACEs on health and wellbeing of the mother as well as parenting and child outcomes. Following this, the health visitor helps parents and identify appropriate support and provides the opportunity to revisit the discussion of ACEs at any time.

A pilot evaluation of the service observed that health visitors were generally positive about the tool and noted that the anticipated additional capacity constraints were not realised. Moreover, user feedback from mothers suggested improved perceptions of physical health and availability of emotional support from friends and family. The evaluators concluded that this feedback provided tentative evidence that ACE screening was feasible and acceptable within a health visiting setting (Hardcastle & Bellis, 2019).

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